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GEOLOGICAL GLOSSARY

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GEOLOGICAL GLOSSARY.

FOR THE USE OF STUDENTS.

BY THE LATE

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PREFACE.

THE object of this work being, not to supplant those glossaries which aim at the enumeration and explanation of all the various terms which are made use of in works on geology, but to act as a companion to the recognised text-books for the use of students, it has been necessary to avoid erring in either of two directions. While it was necessary to explain all the terms in ordinary use, it was also necessary to make these explanations short and concise, and to omit many words and terms which are infrequently used, or which should more properly be looked for in works on mineralogy, palæontology, &c.; such, for instance, as the various species of minerals and rocks, or the genera of fossils, which, if admitted, would have swelled this work to an inconvenient bulk.

It is hoped that this object has been attained, and that in the following pages no omissions of importance will be found.

R. D. OLDHAM.

RUGBY, *May* 27, 1879.

GEOLOGICAL GLOSSARY.

Abnormal.—Not in the usual course of events. *See* NORMAL.

Abrasion.—A wearing away by friction or rubbing, such as that caused by currents of water charged with sand or other débris, by glaciers, by icebergs, &c. *See* DEGRADATION, DENUDATION.

Accretion.—An addition of new matter externally: used only with reference to increase of mineral or inorganic bodies. Plants and animals assimilate additional matters; minerals increase by accretion.

Acicular.—Like a needle; occurring in needle-like prisms having acicular structure.

Acinose.—Granulated, like seeds: applied to mineral texture.

Adamant (ἀδάμας, unsubdued).—A term applied to several minerals, all agreeing in the property of extreme hardness, such as the diamond. ADAMANTINE, hard as adamant, or having the lustre of a diamond; often used, too, in the general sense of being very strong or hard.

Adit.—A mining term; a roadway or tunnel or level driven in horizontally, from side of hill or lower level, as an entrance to a mine or for removal of ores, or as a passage for the water.

Aërial.—Relating to the air, or atmosphere. *Sub-aërial*, occurring under the atmosphere, as different from *sub-aqueous*, under water.

Aëriform.—Like air, opposed to solid and liquid.

Aërolite.—*See* METEORITE.

Affluent.—A stream flowing into or joining another is called an *affluent*, the stream into which it flows being the *recipient*. *See* TRIBUTARY.

After-damp or Choke-damp, or Carbonic acid.—So called as occurring in mines *after* an explosion of fire-damp or carburetted hydrogen.

Agglomerate.—" A coarse breccia composed of fragments of rock cast out of volcanic vents, for the most part angular, and without any admixture of water-worn stones."—*Lyell.*

Aiguille.—A needle: applied in physical geography to the sharp peaks or needle-tops of lofty mountains.

Air-course.—In mining, especially in coal-mining, where artificial ventilation is carried out, the fresh air is carried down from the surface by what is called the *down-cast* to the level of the workings, and the current is then *coursed* along through the workings, and, having passed through all parts of the mine requiring ventilation, is again discharged to the surface by the *up-cast.*

Alloy.—A combination of two metals, either natural or artificial: thus, brass is an alloy of copper and zinc; bell-metal is an alloy of copper and tin; bronze is the same alloy in different proportions; type-metal is lead and antimony.

Alluvium.—Literally, washed down. Matter washed down or accumulated by the ordinary action of water, and deposited, when dry constitutes alluvium. *Alluvial* soils or rocks are in this way formed of mud, sand, or silt, brought together by the ordinary action of water in lakes, in estuaries, on banks of rivers, &c. &c.

Alveolus.—Literally, a small trough or channel. A term applied in various ways. The conical chamber of the *belemnite* is called the *alveolus.*

Amalgam.—A mixture of mercury with other metals; an alloy in which one of the metals is mercury.

Amber.—A well-known fossil gum or resin (*Pinites succinifer*).

Amorphous (α, μορφή).—Without definite form or structure; massive.

Amphibia.—Capable of living either on land or in water: used as a distinctive name for an order of animals (*e.g.* frogs and newts) which have both lungs and gills at some period of their life.

Amygdaloid.—When volcanic rocks have certain almond-shaped cavities, either wholly or partially filled with minerals, such as agate, calcspar, &c., they are called *amygdaloid;* the filled or half-filled cavities looking like almonds in a cake.

The cavities were originally hollow and due to air-bubbles imbedded in the mass; but subsequently water filtering through the pores of the rock, and carrying with it various substances in solution, has deposited the matter in the cavities, which have thus become either partially or entirely filled.

Analogue and Homologue.—Contradistinguishing terms, used in description of structure in organic life. Analogue has reference to a similarity of function; homologue to an identity of parts. Thus the humerus or bone of the fore-limb is homologous, whether we find it in the arm of man, in the wing of a bird, in the paddle of the cetacea, or in the fore-leg of a hare; while the wing of a bird and the dermal expansion of a bat are analogous, both contributing to a similarity of function, *i.e.* enabling the creature to fly.

Anemometer.—An instrument for ascertaining the direction and force or intensity of the wind.

Aneroid.—Without fluid: the designation given to a peculiar form of barometer, in which no fluid, either mercury or spirit, is used. The variations in the pressure or weight of the atmosphere are measured by the elevation or depression of the thin flexible surface of a partially exhausted metallic box.

Anhydrous.—Without water: applied to minerals which do not contain water of crystallization—that is, water as an ingredient of the mineral. *Enhydrous* is the opposite or corresponding term.

Annealing.—A gradual and slow cooling down of molten matter, such as glass or porcelain, by which they are rendered much less brittle, and become tougher and more malleable. An analogous result is seen in lavas. If molten lava be cooled rapidly, it becomes glassy (obsidian, &c.); if slowly, it becomes granular and stony: the more rapid the cooling, the more glassy the result.

Antarctic.—Opposite to Arctic. The regions, &c., round or near to the South Pole, as opposed to the Arctic, are called Antarctic, as Antarctic Seas, &c.

Anthracite.—A coal consisting almost entirely of carbon, often called stone-coal; has generally a more or less compact texture, a conchoidal fracture, and metallic lustre; burns with a very weak flame or none. Vegetable structure still traceable under the microscope.

Anthropoid.—Resembling man. Anthropoid apes are those which more nearly approach the form of man.

Anthropology.—History or study of man, or of the human race.

Anticlinal.—Dipping in opposite directions. Beds of rock which incline or dip in opposite directions from one common axis, are said to form an *anticlinal;* beds which from opposite directions incline towards one common axis are said to form a *synclinal.*

Antipodes.—Opposite to the feet. If a line be supposed to be drawn from the feet of any person on the earth's surface right through the centre of the earth and to the other side, the point of its intersection with the other or opposite surface will be the antipodes of the person or place mentioned. The word is applied either to the locality or the people in the locality.

Apophysis.—A process of a bone being itself a part of the same bone. *Epiphysis*, a process attached to a bone not being part of the same bone, but ossified from a distinct centre.

Aqueous.—Watery; relating to or formed by water. Aqueous rocks are rocks formed by the action of water, to a large extent synonymous with stratified or sedimentary rocks.

Arborescence.—Literally, a growing like a tree: a term applied to those *dendritic* or tree-like forms, often observable in the crystallization of minerals.

Archetype.—An original type or model, after which other forms are modelled.

Arctic.—Literally, relating to or connected with the ἄρκτος or polar bear, the constellation marking the North Pole in the heavens: hence applied to the earth, as the *Arctic regions*, *Arctic seas*, *Arctic circle*, &c., those near the North Pole. Also used to imply extreme cold, as an *Arctic climate.*

Arenaceous.—Sandy; composed of grains of sand. Depending on the relative admixture of other materials, rocks are called *calcareo-arenaceous*, or *arenaceo-calcareous*, &c.

Argentiferous.—Yielding or holding silver, as *argentiferous veins*, &c.

Argillaceous.—Clayey, composed of clay, or having a large proportion of clay. Argillaceous rocks may be known by the peculiar odour which they throw out when breathed upon, called the "argillaceous odour." Varying mixtures of other materials, such as sand and lime with clay, are said to be *argillo-arenaceous*, *argillo-calcareous*, &c.

Arkose.—A name introduced by Brongniart to designate a mechanically formed rock, the materials of which are the same as those of granite, but re-arranged after disintegration. These materials—crystals of felspar, quartz, and even mica—have after separation, resulting from disintegration of the original rock, been reunited by a siliceous cement.

Arm of the sea.—A deep, comparatively narrow branch of the sea, extending some distance inland from the coast. *See* FIRTH.

Artesian.—Literally, relating to Artois or Artesium, a province of France. Here wells have for generations been sunk perpendicularly through the rocks, and the water has been forced to rise in these wells to, and often to overflow at, the surface: hence the term *Artesian well* is applied to such wells in which the water comes up to or near to the surface. Where any porous or water-bearing stratum or series of beds is placed between two non-porous or water-tight beds, all water which falls on the outcrop of such beds sinks into the porous beds, and gradually passing downwards is held there as in a close pipe, which gradually gets filled. If now an artificial opening be made into this water-bearing bed, and free exit thus given to the contained water, it will rush out with a force depending upon the hydrostatic pressure of the mass of the water above the orifice; and if enclosed in a tube or well, it will rise towards the surface nearly to the elevation of the original source of the water. As the wells are for the most part placed in the lower grounds, the pressure is often sufficient to force the water to some height above the surface. Such wells are numerous in the London basin, in the Paris basin, &c. As the water percolates down from the surface it assumes the higher temperature of the rocks below, depending on the depth of the well. Water obtained in this way is frequently very considerably heated.

Articulated.—Jointed, fitted together, or separated by joint-like partings. Columnar rocks are often thus separated, as at the Giant's Causeway. This form is often spoken of as a *ball-and-socket* jointing.

Assay.—Applied specially to the determination of gold and silver in their alloys, but is generally used also to imply a rough analysis for determination of the principal ingredients.

Assimilation.—A making like: the process by which plants and animals convert their food into their various tissues and parts.

Atmospheric.—Of or pertaining to the air or *atmosphere.*

Atoll (a Malay word, *atol*).—A coral island of an annular form; a more or less ring-like belt of coral reef, with a basin or lagoon enclosed.

Attle.—An old Cornish miners' term for rubbish with little or no ore in it.

Attrition.—Wearing down by rubbing or friction.

Auriferous.—Yielding gold, as an *auriferous reef* or *vein.*

Avalanche.—When the slope of a hill-side is too rapid to permit the snow to accumulate and its lower portions to be gradually converted into ice, the snow, and often even the *nevé*, slips down, and, carrying with it everything that has fallen on it, acquires increasing rapidity of motion, till at last it is hurled with terrific force down the hill-side, sweeping everything before it. This is called an *avalanche.* In glaciers also, if the ice-stream arrives at a steep cliff over which it cannot pass without fracture, huge *ice-avalanches* are detached and precipitated into the lower parts of the valley.

Avicula contorta Zone.—A thin group of beds characterized by the presence of the fossil *Avicula contorta.* Their true position was disputed, whether top of Trias or base of Lias. Now generally admitted to belong to the Trias, and from their good development in the Rhætic Alps have been called the *Rhætic beds.* The section differs in different places, and local names have been given for such minor peculiarities.—*Penarth beds, Infra-lias, Kössen beds,* &c.

Axis.—An axle-tree. A word largely used, implying a line referred to which parts of any body are symmetrical; a line about which they are curved or bent, around which they turn: such as the *axis of a crystal, axis of revolution, axis of elevation, synclinal* or *anticlinal axis,* &c.

Ayrstone.—Soft whetstones used for sharpening or polishing, called so from a good variety being found near Ayr. Similar whetstones are also called *snakestone,* from the spotted appearance they frequently present.

Back, Backs.—A mining term, signifying the portion of a vein or lode near the surface; as, *back of the lode*. *Backs*, in coal mining, are the joints or planes of division in the coal, which for the most part run parallel to or with the strike of the beds; while the term *cutters* is generally given to those joints which cross the beds.

Barrier reef.—*See* Coral reef.

Basin.—Any arrangement of bedded rocks, where they dip or slope towards a common centre or axis; a depression in older rocks, filled in with newer; any area in which all the streams unite in one common drainage: as, *basin of the Nerbudda River*, *basin of the Mediterranean Sea.*

Basset.—*See* Outcrop.

Bathymetrical.—Literally, measuring of depth. A term applied to the different zones or regions in which plants or animals are distributed, considered with reference to the depth below the surface of the sea, or the level of the sea-shore.

Bed.—Implies any layer of similar thickness and texture or composition throughout; as, *a bed of limestone*, *of sandstone.* In strict sense, it means only the surface of the layer, but is commonly used for the whole layer.

Bell-metal.—An alloy of copper and tin, used for bells. The larger the proportion of copper, the graver the tone. Small proportions of other metals are often added to alter the tone.

Bind.—A miner's or quarryman's term for tough argillaceous shales.

Bing.—Literally, a heap; a miners' term for a measure or fixed quantity of ore, or mineral output of a mine. The quantity varies in different places.

Binomial system.—The system by which animals and plants have two distinctive names, one indicating the genus, the other the species; as, *Felis leo*, the lion, a species of the generic group of Cats.

Bitumen.—Mineral pitch. *Naphtha*, very fluid; *petroleum*, of consistence of thick oil; *maltha*, slaggy; *elaterite*, elastic bitumen; *asphalt*, solid,—are all varieties of bitumen.

Bituminous.—Yielding bitumen, or holding bitumen in composition. This term is also commonly used for certain varieties of coal which burn freely with flame, although they really contain no bitumen.

Black amber.—Name given by amber-diggers to jet which is found with amber. It becomes faintly electric when rubbed.

Black-band.—Some of the clay ironstones (carbonates) hold sufficient coaly matter in themselves to calcine the ores, without the addition of other fuel. These are called *black-bands.*

Black-jack.—Common miners' name for zincblende. When pure, 67 of zinc, 33 of sulphur.

Black-lead.—A common name for graphite or plumbago; it really contains no lead, but the name was given from the lead-like colour and aspect. It is a form of carbon.

Blind coal.—Coal burning without flame; anthracite.

Blowers.—In coal mining; puffs or jets of gas (carburetted hydrogen) blown out of the fissures of the coal, where newly opened out by mining, often with considerable force, and for a long time.

Blue-john.—Common miner's name for fluor-spar.

Bluffs (American word).—High, steep, or precipitous banks facing a river or sea.

Bog.—Common name in Scotland and Ireland for a wet spongy morass, chiefly composed of decaying vegetable matter or peat.

Bole.—Earthy soft friable clay, generally highly coloured with iron; often furnishes pigments; occasionally contains so much iron as to become an ore rich enough to be used in smelting. The term is very loosely applied.

Bord, in coal-miners' phraseology, is the face of the coal parallel with or along natural fissures. The *ends* are at right angles to these fissures.

Boreal.—Of or pertaining to Boreas, the north wind; hence applied to northern or very cold countries (Boreal regions) or conditions (Boreal climate).

Boss.—Literally, a round knob: hence applied to any projecting mass above the general surface.

Boulder.—A rounded mass of stone, too large to come under the name of pebble or gravel. A term now generally restricted to the water-worn masses of rock which occur abundantly over our northern latitudes, and which have probably been carried by ice. Also called *erratic blocks*, as they are generally found at a distance from their parent masses.

Boulder-clay.—Term given to the stiff unbedded clay connected with the Ice period, and characterized by the numerous large, somewhat rounded boulders or masses of rock imbedded; generally believed to have been carried by ice and dropped irregularly.

Bovey coal.—Local name for the lignite raised near Bovey or Bovey Tracey in Devonshire.

Brash.—An old English term for a rough fragmentary aggregation; breaking up or brashing easily. *Cornbrash*—a local name for certain beds in the Oolitic formation—signifies a coarse fragmentary rock breaking up easily, and yielding a soil useful for growing corn.

Breccia.—A rock composed of re-cemented *angular* fragments of other rocks: differs from a conglomerate in having its component parts angular, not rounded.

Brick-clay.—Any clay used for making bricks with. Brick-clays should have no lime or other alkaline earth, as such would act as a flux. The ordinary red colour is derived from the peroxidation of the iron in the clay during burning.

Bronze.—An alloy of copper and tin. Proportions vary according to the object. Ancient bronze has 4 to 15 per cent. of tin; statuary and medal bronze generally has a small admixture of zinc and lead; best bell-metal has about 78 of copper, 22 of tin; best gun-metal, 91 of copper and 9 of tin.

Brown coal.—Another name for lignite or wood-coal, from its brown colour, so different from the shining black of true coal.

Bucking.—In metallic mining, crushing ore. *Bucking iron*, name given to the flat hammer used in hand-work; *bucking plate*, the plate or bed on which the ore is placed.

Buddle.—Mining term for a pit, trough, or frame filled with water, in which the mixed ores are agitated or jerked up and down, by hand or by machinery: the free motion thus given to the particles of ore, &c., enables them to settle down in layers according to their gravity, the heavier going to the bottom, so that they can be easily separated.

Bunch of ore.—An irregular mass, too large to be called a stone, but still not a continuous vein.

Bunter.—The German term for the lower part of the New Red Sandstone, so called from its variegated colour.

Burr-stone.—Certain siliceous rocks, which on their fractured surfaces present a *burr* or sharp-cutting texture, which renders them well adapted for millstones.

Cainozoic.—With new or recent forms of life, as distinguished from Palæozoic, having ancient forms of life; and Mesozoic, having intermediate forms,—the three great groups into which the fossiliferous rocks have been separated.

Caking coal.—Coal which *cakes* or runs together while burning.

Calcareous.—Containing lime. *Calcareous sandstone*, one in which the grains of sandstone are cemented together by carbonate of lime.

Calcine.—To reduce by heat to a calx, or a friable condition: thus, hard limestone is reduced by burning to quicklime, which falls to powder on applying water.

Calc-sinter, Calc-tuff or **tufa** (from the German *sintern*, to drop).—Calc-sinter is a slowly-formed compact deposit from water of calcareous matter. Calc-tuff is a porous vesicular deposit of the same kind; often coats or encloses leaves, twigs, &c.

Calp.—A local term used in Ireland for the impure argillaceous limestones and shales which form a thick and well-marked band between the two great bands of Carboniferous limestone, upper and lower.

Cameo.—A stone or other substance on which the subject is engraved in relief; *intaglio*, in which the subject is cut into the stone.

Canine.—Of or pertaining to a dog; dog-like: specially applied to those strong sharp-pointed teeth which occur on each side between the incisors and the molars, and which are remarkably well developed in dogs.

Cannel coal.—Coal yielding bright candle-like flame, hence *cannel;* called also *parrot coal*, from the crackling, chattering noise it makes when thrown upon the fire. A compact, jet-like coal.

Cañon (Spanish).—A deep gorge; a cut made or eaten out by rivers, with nearly perpendicular sides. Many in Colorado are 3000 to 4000 feet deep. They are cut chiefly through stratified rocks, occasionally even granitoid rocks. The essential conditions of the existence or production of such cañons appear to be the drainage of a wet region, when rain is abundant, passing across a region of no rain (or very little), where no side stream could exist to break through the continuous walls of such a cut.

Capillary.—Hair-like; applied to the fine filaments or hair-like crystals in which some minerals occur; also to fine tubes of less than $\frac{1}{20}$ of an inch in diameter.

Carboniferous.—Coal-bearing; yielding coal.

Caudal.—Connected with the tail, as the *caudal fins of fish*, &c. &c.

Cawk.—Common term for heavy spar; sulphate of barytes.

Cement.—Any substance which fills up the spaces between the larger blocks in a mass or in building, and holds them together.

Cervical.—Belonging to the neck, as the *cervical vertebræ*.

Chalk.—Earthy, powdery limestone; varies in colour, but for most part is white or whitish.

Chalybeate.—Containing iron; applied to springs or waters holding iron in solution; may be also either carbonated, that is with the carbonate, or sulphated, holding the sulphide of iron.

Charcoal.—The residue of any combustible after smothered combustion, or heating to redness in close vessels or ovens: thus, *animal charcoal* is the residue after the combustion of oils, fats, bones, &c.; *wood-charcoal*, from combustion of wood, twigs, &c.; *mineral charcoal*, commonly called *coke*, from the smothered combustion of ordinary coal.

Chart.—A map or plan; generally applied to marine maps.

Chert.—Impure siliceous flint, or flinty portions of rock, often contained in limestones; generally has a less perfectly conchoidal fracture than flint, and is tougher; often fusible from an admixture of calcareous matter. Limestones, which will not burn easily into quicklime from the amount of silica they contain, are called *cherty*.

Cinder-bed.—Beds in the Upper Purbeck, so called from the loose and incoherent nature of the rock, almost entirely composed of oyster-shells.

Clavate.—Club-shaped; slender at one end and gradually increasing in thickness, and terminating obtusely at the other.

Clay ironstone.—A common name for the impure carbonates of iron, which occur in beds, nodules, and bands, in the Carboniferous and other rocks.

Cleat.—*See* BORD.

Cleavage.—A peculiar fissility, or tendency to split into planes, produced in many rocks, principally in the more homogeneous or clayey beds. These planes of cleavage are entirely independent of any original lines of bedding or of subsequent contortions, passing across either continuously, but quite independently. This subdivision of the mass into flakes or layers is the result of enormous pressure, exerted at right angles to these planes of division.

Clinker.—The black oxide of iron which is scaled off hot iron when struck with the hammer; also used for the slaggy scales which attach themselves to the furnace bars.

Clunch.—Any tough coarse clay: used provincially for some of the coarse clayey beds of the Coal measures and other formations.

Coal.—The mineralized result of the slow decomposition of vegetable matter. This may be of various kinds, and the compression and alteration may have progressed to various degrees in different coals. Every gradation therefore from wood, or woody tissue, through peat, lignite, coal, to anthracite, or pure carbon, as graphite, may be traced.

Coke.—The carbonaceous residue of coal subjected to a smothered combustion. *See* CHARCOAL. Formerly burnt in open heaps, now generally in specially designed ovens.

Columnar.—In columns or prisms, like the basalt of Staffa at the Giant's Causeway. When the structure is indistinct, it is said to be *sub-columnar*. The divisions result from the cooling and contraction of the mass.

Composition.—*See* STRUCTURE.

Conchoidal.—Like a shell; applied to the peculiar fracture of some compact masses, which exhibit curved and quasi-concentric markings like the outline of a shell.

Concretions.—Nodules or irregular masses, formed by aggregation, not crystallization.

Congener.—Of the same genus or kind.

Confluence.—The point where two streams meet.

Conformable.—When successive beds of rock are lying at the same angle, regularly one above the other, they are said to be *conformable.* When the same dip at a different angle from the others on which they rest, they are said to be *unconformable.*

Conglomerate.—A mass composed of rounded pebbles or masses of various rocks, cemented together, is called a *conglomerate;* it differs from a breccia in having the enclosed pebbles rounded, while in breccia they are still angular.

Contortions.—The foldings, curvings, and bendings to which layers of rock have been subjected, are called *contortions.*

Coprolite.—"Dungstone;" the droppings of various animals converted into stony matter.

Coral reef.—A reef formed by the action of reef-building coral polypes, which separate carbonate of lime from the waters of the sea to form their internal skeleton. Coral reefs are divided into *fringing reefs,* which closely encircle or form a fringe round the land; *barrier reefs,* which run more or less parallel with the coast, but at some distance from it so as to leave a broad channel between the two; and thirdly, *atolls.* These are merely different stages of the same thing: as the land sinks the coral polypes build upwards, and the fringing reef becomes a barrier reef, and finally an atoll.

Coriaceous.—Hide-like; tough or leathery in substance.

Cornbrash.—*See* BRASH.

Cornstone.—The reddish and bluish red concretionary limestones occurring in the Old Red Sandstone; name said to be from the good quality for cultivation of corn of the soils formed over these rocks, so different from the cold stiff clayey soils formed over the marls.

Cosmos.—Literally, order; the whole framework of the material universe.

Costeaning.—The system of tracing the existence of lodes in a country where the rocks are covered, by sinking a series of small pits and driving at right angles to the general direction of the lodes, so as to intercept their lodes in their course.

Coulée.—A term frequently used to express a stream or flow of lava, whether actually hot and in motion, or long since solidified and cooled down.

Crater.—Literally, a cup; the cup-shaped orifice of a volcano. Craters may be central or lateral, principal or secondary, &c. One side of the encircling lips of craters is generally lower than the others, owing to the prevalent winds, which carry the larger portion of the light materials thrown out to the opposite direction.

Creep.—A miner's term to express the rising up of the floor of the galleries or working drifts, caused by the pressure of the mass above on the pillars or supports of the roof, so as to squeeze or bulge up the floor. The pressing or bulging down of the roof in the same way is called a *crush.* Both proceed so far sometimes as to entirely block up the gallery.

Crevasse.—A gaping rent or fissure in a glacier.

Crop or **Outcrop.**—The line along the surface of the ground in which a bed of rock meets that surface is the *outcrop* of the bed. It must not be confounded with the *strike*, which is the horizontal line on the surface of the bed at right angles to its line of dip, and is therefore quite independent of any consideration of the surface of the ground.

Cross-course.—Miners' term for a vein or lode which *crosses* or intersects the direction of the main productive lodes in a district. These latter are called *right running lodes.*

Cross-cut.—In mining, a level driven at right angles to the known direction of a lode, to cut it.

Crush.—*See* CREEP.

Crustacea.—An order of animals (such as crabs, lobsters, &c.), which are characterized by having a hard body covering divided into segments and no internal skeleton.

Culm.—Impure shaly coal; anthracitic shales.

Cutters.—Term used by quarrymen for the cracks or fissures which cross or *cut* the strata. What geologists would call a jointed structure is expressed by them as *backs* and *cutters.*

Cycle.—Literally, a circle of time; a periodically recurrent interval or space of time: used often indefinitely for more fixed periods.

Damps.—A miner's term for the gases evolved or produced in coal mines. *Choke-damp*, carbonic acid, so called from its extinguishing or choking out life and flame; *fire-damp*, light carburetted hydrogen, from its exploding when brought into contact with flame after certain admixture with atmospheric air.

Dauk.—*See* Douk.

Deads.—A miners' term for those stony masses broken down underground, which are so dead or unproductive as not to be worth dressing; mine waste or rubbish.

Débris.—Any loose material arising from the waste of rocks; accumulation of such. A French word, now generally adopted in English.

Decomposition.—A breaking up of any compound into its elements or into new compounds: for example, decomposed felspar yields a clayey substance known as *kaolin*.

Decrepitate.—To break up with a crackling noise, as Cannel coal does when exposed to heat, &c.

Degradation.—A gradual wearing away; step by step. Thus, the general surface of the earth is degraded by running water; waves degrade the coast. These degrading causes are (1) atmospheric, (2) fluviatile, (3) marine.

Deliquescence.—Salts, &c., are said to deliquesce, or to be deliquescent, when by absorption of moisture from the air they become liquid.

Delta.—The alluvial land formed at the mouth of a river. As this has always a tendency to spread out on both sides of the mouth, and also to be carried forward by the stream, a triangular shape, more or less regular, is given to the deposits: hence the name, first given to the delta of the Nile, from the resemblance of the outline to the Greek letter Δ.

Dendritic.—Like a tree. Term applied to the moss or fern-like incrustations, principally of iron and manganese, often found on the surfaces of fissures in rocks, like the dendritic crystallizations of water on a pane of glass on a frosty night.

Density.—The closeness or compactness of the particles of a body; the more compact or close set, bulk for bulk, being the heavier. Also, *vice versâ*, as the gravity is in proportion to the density, the gravity or specific gravity of any body may be taken as a measure of the density.

Denudation.—Literally, a laying bare: thus, the removal by water or other agency of any overlying masses so as to expose those underneath is a *denudation.* *Denuded* rock surfaces are those from which such masses have been removed.

Deposit.—Anything which has been thrown down, or has settled down, as from suspension in water, such as muds, sands, &c. In geology deposits are frequently characterized by the conditions under which they have been found, as well as by their mineral character or composition: thus, we hear of *lacustrine*, *estuarine*, *marine*, *glacial*, &c., *deposits.*

Dermal.—Pertaining to the skin or outer covering.

Dermo-skeleton.—The hard covering which gives support and protection to many animals. It is the external or exo-skeleton, as distinguished from the internal or endo-skeleton, or true skeleton, of higher vertebrates.

Desiccation.—A drying up, by removal of moisture from any mass. As all bodies contract or shrink when thus dried, they crack, and are split up by fissures often assuming very regular forms: these are called *desiccation cracks*, but must not be confounded with *cleavage.*

Detritus.—Anything rubbed or worn down. Detrital matter may be of any kind, depending on the nature of the rocks or masses subjected to wear.

Dextral, right-handed, and **sinistral**, left-handed, are terms applied to spiral shells. When the mouth of such a shell is placed before the observer with the spire uppermost, if the whorls turn from left to right, the shell is called *dextral.* This is the normal direction. If they turn from right to left, the shell is called *sinistral* or reversed. Place the shells vertically, with the spire uppermost, and mouth towards the observer and pointing upwards: if the aperture be towards the right, the shell is *dextral;* if to the left, the shell is *sinistral.*

Diluvium.—Deposits due to some extraordinary action of water, as distinct from *alluvium*, which implies only the ordinary action: used to be supposed to represent the action of the Deluge, but is now applied to any mass of débris which necessitates the idea of a more than usually strong agency of water.

Dip.—The angle or inclination measured from the horizontal at which beds or strata slope downwards into the earth. *Rise* is the corresponding term; that is, beds, which dip to east, rise to west, at the same angle. The line at right angles to the dip is called the *strike:* thus, beds dipping to the north strike east and west; dipping to south-east, strike north-east and south-west. *Strike* must not be confounded with *outcrop*, as it very frequently is: the outcrop is the line, often very irregular, along which the edge of a bed or series of beds meets the surface of the earth.

Dip slope.—*See* ESCARPMENT.

Dirt-bed.—Name given to some dark-coloured beds; old soils in which trees, fragments of timber, and numerous plants are found.

Dirt-bands.—Lines of débris-filled ice alternating with clearer ice in a glacier.

Disintegrate, Disintegration.—A breaking up or asunder of matter, as by frost, rain, &c.

Doab.—The portion of country included between two rivers down to their point of confluence.

Dorsal.—Pertaining to the back; as, *the dorsal fins.*

Douk.—An old mining term, signifying a band of hard, tough, compact clay, generally without any lamination, and looking as if kneaded together, like dough.

Downs, Dunes.—*Downs* is the term generally applied to the peculiarly rounded dry and bare hills of chalk in the south of England. The same word, but generally used in the form *dunes*, is used for the low hills of blown sand which are frequent along the low shores of the coast. These *sand dunes* often extend for miles, and form a regular series of defined ridges, for the most part at right angles in their direction with the prevailing winds.

Downthrow.—*See* FAULT.

Dressing of ores.—A mining term, meaning the breaking, crushing, washing, &c., of the ores raised from a mine, so as to get rid of the stony and other matters mixed up with the metallic ores.

Drift.—Often used as an abbreviation of the fuller term of *glacial drift:* also used in the more literal sense of *driven;* as, *drift-wood, sand-drift. Drift currents*, those depending chiefly on the winds.

Druid-stone.—*See* GREY WETHERS.

Druse, Drusy.—Any hollow space in a rock lined with crystals.

Dunes.—*See* DOWNS.

Dyke.—A wall; applied to those wall-like runs, chiefly of igneous rocks, which fill up the rents and fissures in other rocks.

Earthquake.—A shaking of the earth's surface by some subterranean force. It is a wave of elastic compression produced in the crust of the earth by the sudden exertion of some force in the interior.

Efflorescence.—Literally, a flowering. Those incrustations which are formed on the surface of certain minerals, on exposure to the atmosphere, when, chemical changes taking place, fine crystals are formed on the surface, giving somewhat the effect of flowers. *Efflorescence* results from an evaporation of moisture; *deliquescence*, from a taking up or absorption of moisture.

Elvan.—The Cornish term for the courses, dykes, or veins of a compact felspathic and occasionally porphyritic granite, which are common in the mining districts of that country.

End.—The direction of the lesser joint planes in coal, generally at right angles to the *cleet*.

Enhydrous.—Holding or containing water. *Anhydrous*, without water.

Eolian.—A term applied to deposits arranged by the wind, as the sands and other loose materials along shores, &c. (from Eolus, the god of winds). *Sub-aërial* is often used in much the same sense.

Epiphysis.—*See* APOPHYSIS.

Epoch.—Literally, a point or stop in time, from which successive ages are counted, but used less accurately as meaning an age or era; as, *the Carboniferous epoch.*

Era, similarly, is properly a fixed point from which later years are calculated, but is also used not only to indicate the commencement of a time, but the duration of it; as, *the Oolitic era*, &c.

Erosion.—A gnawing away; gradual wasting by the action of water. *Valleys of erosion* are valleys gradually cut out in this way by the erosive force.

Erratics or **Erratic blocks.**—Those large water-worn blocks, common in higher latitudes, which appear to have been carried by the agency of ice.

Erratic block group.—Another name for boulder clay.

Escarpment.—A long line of hills formed by the cropping of a harder over a softer bed; it has a steep or "scarped" side facing towards the softer bed, and a gentler slope formed by the surface of the harder bed: this latter is known as the *dip slope.*

Escars or **Eskers.**—Long, often flat-topped ridges of gravel, called *ôsar* in Scandinavia, *kaims* in Scotland, *escars* in Ireland.

Estuary.—The portion of a river near its mouth, affected by the tide. *Estuarine deposits* are those which appear to have been formed in an estuary; and as the animals and plants which live in the brackish water of tidal areas are quite different from those existing either in the more open sea, or in the fresh water of the upper part of the river, important differences result as to the fossils contained, and the mode of arrangement of the strata.

Exfoliate.—To separate into leaves or laminæ; to scale off.

Exotic.—Belonging to outside or other countries. *Indigenous,* grown or produced in the same place.

Exuviæ.—The cast-off coverings of animals, such as the skin of a snake, or the shell of a crab: hence used in a wider sense for all fossilized organic matter, or fragments.

Face.—In crystallography, used to express one of the surfaces which bound any regular solid, as the six *faces* of a cube, &c. In coal-mining, is the same as *bord.*

Fæces.—Excrement or droppings of animals, frequently found fossilized, as coprolites.

Falling stones.—Common name for aërolites or meteoric stones.

Farewell rock.—A common name in Wales for the millstone grit, because, once reaching it, you may bid farewell to finding any workable beds of coal below.

Fault.—Any break in the position of rocks once continuous. The beds are thrown up on one side of this fissure or break, and on the other thrown down; the distance between the two portions measured vertically is called the *upthrow* or *downthrow.* That side of the fault on which the beds are lowered is called the *downthrow* side, while the other is the *upthrow* side of the fault. As a rule faults slope or "hade to the downthrow," so that no two portions of the same bed are brought vertically above each other. In what is known as a *reversed fault*, the conditions are precisely the opposite.

Fauna.—The entire group of animal life belonging to or occurring in any fixed area or country. *Flora* similarly means the entire group of vegetable life—all the plants so occurring.

Fen.—A low, marshy, wet space.

Ferriferous.—Yielding or holding iron.

Ferruginous.—Impregnated with or coloured by iron; rusty-looking.

Fibrous.—In the form of fibres; term used to express certain structures in minerals or rocks.

Filiform.—Thread-like; in long slender threads.

Fiord or **Fjord** (Norse).—A deep narrow sea-channel, extending often many miles inland. Fiords are confined to the higher latitudes of the earth's surface; are old land valleys submerged; also known as *sea-lochs.*

Fire-clay.—Any clay capable of resisting very high heat without passing into a glassy slag, no alkaline substance being present to form a flux.

Fire-damp.—Miners' name for light carburetted hydrogen or gas, which is frequently given out by coal seams, and which, if mixed in certain proportions with air, is explosive or takes fire. Seven volumes of air to one of this gas is about the most explosive mixture. If it forms less than one-thirteenth of the whole mixture, or much more than one-seventh, the mixture is not explosive. *See* DAMPS.

Firth.—The same as fiord—not "frith," as often spelt, which is a strait or passage between two seas (*fretum*). A firth is a long inlet of the sea terminating landwards in a glen or valley; an old land valley submerged by depression of land. Also called in Scotland and the north of Ireland *lochs*, as Loch Nevis, Loch Fyne, Lough Foyle; or even occasionally in other places *bays*, such as Dingle Bay, Bantry Bay. Fiord or firth is, however, generally restricted to the narrower inlets, with usually mountainous sides.

Fissile.—Easily split; like slates.

Fissure.—A rent or division, or open joint in rocks. Rocks are said to be *fissured* when traversed by numerous fissures.

Fjeld.—Flat table-lands, or parts of the old sea-bottom, now elevated; a Scandinavian term. Many of them are extensive and well known, such as the Dovre Fjeld, &c.

Flag-stone.—A sandstone in thin layers, which separate as flags. The thin bedded earthy and bituminous clays or shales are called by northern miners *blaes* or *blaize.*

Flora.—The entire vegetation of any area or epoch.

Flukan or **Flucan.**—Mining term for the soft clayey substances often found in slides or cross-courses in metalliferous countries.

Fluviatile.—Deposits formed in rivers are said to be *fluviatile deposits. See* ALLUVIUM.

Fluvio-marine.—Deposits brought into the sea from the land, and there re-arranged by the waters of the sea, and thus often containing remains of land, fresh-water, and marine animals.

Flux.—Anything added to a mixture of materials to facilitate the flowing together of the earthy matters into a slag is called a *flux.*

Foliation.—In geology, the separation into thin laminæ or layers of the materials of which metamorphic rocks are composed, forming alternating layers of quartz, mica, felspar, &c.

Formation.—Any assemblage of rocks which have some character in common, whether of origin, age, or composition. (Lyell.) A *group* is generally spoken of as a subdivision of a *formation.*

Fossil.—Literally, anything dug up; now generally restricted to the remains of organic nature—plants or animals found imbedded in rocks, and converted into stone. When only partially or imperfectly petrified, they are called *sub-fossil.*

Fossiliferous.—Containing organic remains. *Non-fossiliferous,* not so.

Fracture.—The appearance of the fresh surface of a rock or mineral when broken with a hammer. It may be *even*, when it gives a face or plane; *uneven*, when the surface is rough and unequal; *conchoidal*, giving concave and convex surfaces, like those of a shell; *splintery*, like a number of thin-edged scales; *hackly*, with many sharp projections or inequalities.

Frangibility.—The degree of facility with which a rock can be broken, or yields to the hammer.

Friable.—Easily crumbled, or broken into powder; opposed to tough or tenacious.

Fumarole.—An orifice from which smoke and other fumes are thrown out.

Funiform.—Cord- or rope-like.

Fusiform.—Shaped like a spindle; thickest near the middle and tapering to each extremity.

Fusion.—Melting. Substances which can be melted with some ease are *fusible;* those which cannot are *refractory.*

Gad.—A miners' name for a pointed wedge. Pick and gad, the two chief tools used by Cornish miners.

Gallery.—In mining, a working drift or level from which ore is extracted.

Gangue.—The matrix, veinstone, or veinstuff in which ores occur.

Gem.—Any kind of precious stone.

Genus.—A kind; term in natural history implying the aggregation of a number of species, or members of one group, having more resemblance to one another than to any others.

Geode.—A rounded nodule, having an internal cavity, whether empty or filled, or merely lined with crystals; often called *potato-stones*, &c.

Geognosy, Geogony, Geology.—Geology includes both facts and the reasonings based upon them. Geogony is confined to speculation regarding the original formation of the earth. Geognosy embraces the actual knowledge of the earth and its structure.

Geyser.—Literally, a roarer; intermittent hot springs or fountains. Columns of water are thrown out at intervals with great force, often rising to between 100 and 200 feet; and after the jet of water ceases, a column of steam rushes out with a thundering roar, and the eruption then ceases for an interval.

Ghats.—Literally, the passes, often difficult and narrow, through a mountain ridge, or from the lower plains to the higher plateaux: now very commonly applied to the ridges themselves, especially to the ranges of high ground which stretch along the east and west coasts of the Peninsular portion of India, called the Eastern and Western Ghats.

Gibbous.—Humped; with abrupt protuberances or humps on the surface, or in outline.

Glacier.—A river of ice, or sheet of ice moving down a hill-side.

Glacier table.—As a glacier flows down its valley, its surface is continually being melted; but if any portion of the glacier is protected from the rays of the sun by a piece of rock, the ice under it does not melt, and consequently it becomes raised on a pillar of ice, forming a *glacier table.*

Gneiss.—German word for a granitic-looking rock, which is, however, distinctly banded: used also as a name for the general assemblage of rocks which accompany the lower gneiss, and all of which are more or less like gneiss, or gneissic.

Goaf or **Gob.**—The waste or empty part of a coal mine, from which the coal has been extracted. Goaffin or gobbin is the waste stuff thrown into this goaf, to support the roof, &c.

Gorge.—A narrow rocky valley with perpendicular or almost perpendicular sides.

Gossan.—Cornish mining name for the ferruginous, decomposed, and often quartzose stuff which fills in the "back" of the lodes.

Granite.—A granularly crystalline compound of quartz, mica, and felspar, with occasionally other minerals which give rise to varieties: generally supposed to be an igneous rock, formed under considerable pressure or at great depths.

Graphite.—Same as black-lead or plumbago. It got this name of black-lead from its colour and lead-like aspects, but it contains no lead, being nearly pure carbon: used largely for making pencils, also called *lead pencils* erroneously, and for writing or marking with.

Gravel.—Accumulations of rounded water-worn pebbles. The word *gravel* is generally applied when the size of the pebbles does not much exceed that of an ordinary hen's egg. The finer varieties are called *sand*, while the coarser varieties are called *shingle*.

Gravity or **Gravitation.**—The attractive force which all portions of matter, solid, liquid, or gaseous, exert on all other portions of matter.

Gravity (specific).—The ratio of the weight of any given volume of any substance to an equal volume of some other substance, taken as a standard. The British standard for solids and liquids is distilled or pure water at the temperature of 60° Fahr.; for aëriform bodies or gases, ordinary air, or else hydrogen. This standard is as usual taken as unity, and the specific gravity of other bodies is given in numbers which express the ratio to this standard. Thus, taking the standard as 1, the spec. grav. of lead, for example, is said to be 11·352; that is, an equal volume of lead would be 11·352 times heavier than the same volume of distilled water at the temperature of 60° Fahr.

Greenstone.—A general term for the various trap rocks, composed of felspar and hornblende, of felspar and augite, hypersthene, &c.

Greystone.—A variety of trachyte, composed of felspar and augite, the felspar largely prevailing.

Grey wethers.—Weather-worn and partly rounded blocks; blocks of grey sandstone found scattered over the chalk downs in England; the remnants of the Eocene sandstones left after denudation of the general mass. Called also *Sarsen stones* and *Druid stones*.

Grit.—Not very definitely applied: by some, for sandstones in which the grains are sharper than usual, as a grindstone grit; by others, applied to sandstones of which the grain is coarser than in ordinary sandstones; and by others, to rocks in which the grain is finer than ordinary sandstones, but at the same time equal and sharp.

Group.—*See* Formation.

Gust.—In mining, a gutter or watercourse, cut out of the pavement in a working drift.

Hackly.—With the surface rough from irregularly projecting points. *See* Fracture.

Hade or **Hading.**—A miners' term for the inclination or angle of slope of a vein or fissure, or lode. *Hade* is referred to the vertical; *dip* to the horizontal. *See* UNDERLIE.

Hardness of minerals.—Generally estimated according to a conventional scale of ten degrees, of which well-known and easily obtainable minerals are representative. These are—Talc, 1; rocksalt, 2; calcspar, 3; fluorspar, 4; apatite, 5; Adularia felspar, 6; rock crystal, 7; topaz, 8; corundum, 9; diamond, 10. If the hardness of a mineral be said to be 6·5, it means that it would be easily scratched by rock crystal, but that it would itself easily scratch felspar, or is half-way between the two, 6 and 7.

Heading.—A small gallery driven in advance of the main road or for some temporary purpose.

Heave.—In mining, the displacement of a vein or bed by the intersection of another or a fault. *Heave* is used when the beds are thrown up; *slide*, if they be thrown downwards.

Holing.—Undercutting a bed of coal, so as to remove its support, and thus enable the masses to fall, when wedged off above.

Homologue.—*See* ANALOGUE.

Hone.—A whetstone, or stone for sharpening tools.

Horizon.—The plane or line where sky and earth, or sky and sea, appear to meet; that plane which limits the view. In correct language, the natural horizon as distinguished from the sensible horizon is a great circle passing through the centre of the earth, the poles of which are the zenith and the nadir.

Hummock.—A mound or knoll. Ice is said to be *hummocky* when it consists of the fragments and dislocated parts of a previously existing sheet, refrozen together, and thus producing a rugged surface.

Hydraulic cement.—A cement which *sets* or becomes hard under water.

Hydrocarbons.—Compounds of hydrogen and carbon. All bitumens, mineral resins, &c., as naphtha, petroleum, asphalt, amber, &c., are hydrocarbons.

Hypogene.—Literally, produced underneath: term introduced by Sir Charles Lyell to indicate all crystalline rocks, as being rocks formed below; that is, which had assumed their present aspect not at the surface, but were nether formed.

Hypozoic, in similar way, implies rocks which are below the region or horizon of fossiliferous beds. *Azoic* states positively that no life occurred in them, or at the time of their formation; *hypozoic* only implies their position beneath the beds which do contain organic remains. Probably no stratified rocks are truly azoic or hypozoic.

Iceberg (*Berg*, a rock).—Large masses of ice broken off from the lower ends of the huge glaciers, which in high latitudes force their way down to and into the sea. They float nine-tenths in the water and one-tenth out, so that for every foot of ice above water there are nine feet below. These great masses of ice carry in their substance and on their surface varying quantities of solid matter, varying from fine mud to huge boulders, which as the ice melts are dropped on to the bed of the sea, over which the berg is carried by winds and currents; to this cause the greater number of erratics are due, and to this cause the far-famed bank of Newfoundland probably owes its origin. Icebergs have been seen as far south as the Azores, in 36° N. lat.

Ice-foot.—A cake of ice is formed in Arctic regions along the shore by the freezing of the edge of the sea: this is lifted by the tide, and again frozen to the shore, and thus during the winter a cake of ice often 20 or 30 feet thick and 100 to 150 broad is formed, which on the shore side has a certain quantity of solid matter enclosed in its mass. When the warmth of spring arrives, large quantities of débris come down from the cliffs forming the coast, and are precipitated into this cake of ice: by the continued action of warmth, aided by tides and waves, this ice-foot is broken up and the portions loaded with débris float away, and as they melt deposit their freight on the bottom of the sea. This débris not having been subject to friction and trituration, is *angular*.

Ice-pack or **Pack-ice.**—A term applied to a phenomenon which occurs in Arctic regions, when the ice first formed on the surface of the sea becomes broken up and the separate portions piled or *packed* on top of each other, forming masses very difficult to navigate. Pack-ice is of little importance geologically.

Igneous.—Pertaining to fire: term applied to all results which seem to have arisen from the action of fire or heat; all results of fusion: thus, *igneous rocks*, &c.

Impalpable.—Not perceptible to the touch, such as dust or powder. Mud that is reduced to the finest state of subdivision in the separate particles cannot be felt.

Impermeable.—Not to be passed through by water, as stiff clay, &c.

Incisor teeth.—The front teeth which are shaped for cutting.

Indigenous.—Born or produced in the country where they occur; opposed to *exotic*, brought from other or outside countries.

Indurated.—Rendered hard: confined in geological use to masses hardened by heat, baked, &c., as distinguished from hard or compact in natural structure.

Inlier and **Outlier.**—Two most useful terms in geological description. An *inlier* is a mass of one formation surrounded by another newer than itself, or which rests upon it; *outlier*, an isolated mass of one formation surrounded by another which underlies it, or is older than itself.

Inorganic.—Not produced by living organisms or by vital action.

In situ.—In its natural position; where originally formed.

Intercalated.—Placed between; interposed. Subordinate or minor beds occurring between the main beds of a series, are said to be *intercalated.*

Intermittent.—Ceasing for a time and then returning; acting and ceasing to act at intervals, as is the case with some springs.

Interstratified.—Occurring between other strata or beds: thus, coal, sandstone, shales, &c., are said to be *interstratified;* layers or flows of igneous rocks which occur between the beds of stratified rocks are also said to be *interstratified,* if originally so deposited and not subsequently intruded.

Intrusive.—Thrust in or forced into. Masses of igneous rocks which, while in a state of fusion, seem to have forced themselves into the cracks, or between the layers of stratified rocks, are said to be *intrusive.*

Iridescent.—Shining with the colours of the rainbow (*iris*).

Island.—Land entirely surrounded by water. When occurring in groups or clusters, they form an *archipelago.*

Jade.—A hard, tough, generally greenish rock, smooth and soapy to the feel, consisting chiefly of silicate of magnesia and lime, with a little alumina; it takes a high polish, and is largely used for ornaments, handles of swords and daggers, and in New Zealand for axe-heads (axestone); also called *nephrite*, from its supposed medicinal efficacy in diseases of the kidneys.

Jasper.—An amorphous and impure form of common quartz. It occurs red, yellow, green, brown or whitish, also ribboned (Ribbon or Egyptian jasper); and pieces of considerable beauty, when polished, are by no means uncommon.

Jaspideous.—Resembling jasper.

Jet.—In Prussia, &c., called *black amber;* a black, fine-grained, compact, resinous result of the mineralization of vegetable matter, largely used for cutting into ornaments, brooches, earrings, &c., for which its deep soft black colour renders it very suitable: largely found in the alum shale beds of the north of England.

Jigging.—A mining term for any process by which ores are separated from the useless stuff which is attached to them. The whole is broken up and then thrown into sieves, which are raised and depressed rapidly in water, or jigged. The ores, by virtue of their greater specific gravity, sink to the bottom, while the lighter rocks are brought to the top and scraped off.

Joints.—The planes of separation or natural fissures which divide rock masses into blocks more or less regular. Sedgwick called those joints which run parallel to the strike of the beds in which they occur, *strike joints;* those parallel with dip, *dip joints;* and those traversing both, *diagonal joints.* The miner's terms of *backs* and *cutters* refer to joints, the backs being the *master joints*, which are parallel for considerable distances, &c.

Jumper.—A miners' tool for boring holes; an iron bar steeled at the end, and worked chiefly by the hand.

Kaims or **Kames.**—Name given in Scotland to what are called *eskers* in Ireland and *ösars* in Sweden, &c. *See* Escar.

Kaolin.—Said to be so named from Kau-ling, a high ridge, the name of the hill where first found in China; fine porcelain clay, the result of decomposition of felspar; it is a hydrous silicate of alumina. Average proportion is 48 of silica, 39 of alumina, 13 of water.

Kawk.—A Cornish mining term for fluorspar.

Keuper.—Literally, copper; the upper division of the Trias, so called from the cupriferous shales which are one of its best-marked components.

Kibble.—A mining term for the bucket or measure, generally of iron, in which ores are lifted to the surface.

Killas.—Cornish word for the coarse argillaceous schists in which many of the lodes occur.

Kimmeridge coal.—A bituminous shale, or impure coal, which occurs in the Kimmeridge clays, which are a division of the Upper Oolitic rocks, so called from being well developed at Kimmeridge in the island of Purbeck, Dorsetshire.

Kitchen middens, Kjôkken môdding.—Heaps of shells of various kinds of shell-fish and other refuse, obviously the castaway remnants of the food of ancient people, thrown out around or under their huts. All the implements found in them are of horn-stone or wood, and the people who formed them are therefore supposed to have been unacquainted with the use of metal.

Kössen beds, also known as **Upper St. Cassian beds,** occur at St. Cassian and Kössen; form the beds intermediate between the Upper Trias and the Lower Lias: also called *Rhætic beds,* from the Rhætic Alps, where they occur. One of the most characteristic fossils is the *Avicula contorta.* *See* AVICULA CONTORTA ZONE.

Kunkur (Hindostani).—A nodular or tufaceous concretionary limestone, generally of an ash-grey or dove-grey colour; occurs both in layers or beds, often of considerable thickness and extent, and in detached nodular concretions of various size, imbedded in stiffish clay.

Lacustrine.—Of or belonging to a lake. Deposits accumulated in lakes or marshes of fresh water are called *lacustrine.* Muds, sands, marls, peat, &c., are of this kind.

Lagoon.—A shallow salt-water lake, more or less cut off from the adjoining sea; also, the waters enclosed by circular coral reefs.

Lake.—Any body of inland water not forming part of the sea or any of its branches; a depression in the general surface of the earth filled with water. Most lakes are gradually being filled up by the silt, &c., brought into them, and lowered by the deepening of the channels of outlet. Some have no outlet, evaporation carrying off the excess of water. In Scotland, Ireland, &c., they are called *lochs.*

Lake-basin.—The depression or hollow which contains the waters of a lake, as well as the entire area drained by the streams which fall into any lake.

Lake dwellings.—Remains of dwellings found in lakes and in lake silts. These were erected on piles driven into the ground under water, or on mounds artificially formed of stones and other débris, often of considerable extent, indicating a group of residences or a village: called in Ireland *crannoges,* in Switzerland *Pfahlbauten* (pile structures).

Lamina (pl. *laminæ*).—A thin, leaf-like layer or plate.

Laminated.—In laminæ, splitting up into thin layers. A bed is thus often formed of a large number of laminæ, each being the result of a separate tranquil deposition.

Lamination.—An arrangement in layers. In most cases these laminæ are parallel to the general surface of the beds, but oblique lamination also occurs, and seems to indicate cases in which the material forming the laminæ has been forced forward by currents, not tranquilly deposited, and thus laid down layer after layer on the inclined edge of the deposit: this is also spoken of as *false-bedding.*

Lanceolate.—Thin and tapering, like a lance-head.

Land-locked.—A bay or portion of the ocean almost surrounded or locked in by land. If the communication with the ocean is cut off, it is called *an inland sea,* as the Caspian and Dead Seas.

Landslip.—A portion of a hill-side or sloping mass which becomes loosened or detached, and slips down.

Lapidify, Lapidification.—To convert, or the process of conversion, into stone; the process by which soft animal bodies are converted into hard stone.

Lapilli.—Small stones; volcanic cinders, or slags which are thrown out in showers of little concretions from volcanic vents.

Laterite (*later*, *lateris*, a brick).—A name first given by Buchanan Hamilton to a peculiar red-brown cellular clayey rock, soft and easily cut while fresh and moist, and hardening greatly on exposure. It is readily cut out with an axe into square blocks, like large bricks, and in this state is largely used for building: hence the name. In this the originally described form it is essentially an earthy or clayey mass, containing a large amount of iron, which has frequently been carried into the mass along grasses, small stems of plants, &c., and has thus formed pipes and irregular cavities which permeate the whole, and are often filled in with a soft clay of lighter colour than the mass. But the term has been very loosely applied to many brick-red deposits of very varying character, from coarse gravelly grits to the most perfect bole, or compact dense red clay. The name has therefore become useless as indicating any special mineral character, though still very excellent as indicating the peculiar condition in which such rocks are found.

Latitude.—The position of a place on the earth's surface, measured in degrees and parts of a degree from the equator. If to the north, it is called *north latitude;* if to the south, it is *south latitude.*

Lava.—A general term for all molten matter which flows from volcanoes. When cooled down, it forms rocks of very varying kind, according to the conditions under which it cools.

Leeward.—Away from the wind. The side of a ship exposed to the wind is the *windward* side, or *weather* side; that sheltered from the wind is the *leeward* side; and things or objects are said to be to *windward* or *leeward* according to their position.

Lehm.—Another word for *Loess*, which see.

Lenticular.—In the form of a lentil; shaped like a lens; as, *lenticular concretions*, *lenticular pebbles.*

Levigation.—A rubbing down to a powder. Levigation is distinguished from *trituration* by being done with water, while the latter is the dry method.

Lias.—Supposed to be a provincial corruption of *lyers* or *layers:* the lowest division of the Oolitic system, by some considered a system in itself.

Licks.—An American word for swampy areas surrounding salt springs, the soil of which is *licked* up by animals frequenting them. Some are of old date, as proved by the occurrence of the bones of the mastodon and other extinct animals; as, the Big-bone Lick in Kentucky.

Ligneous.—Woody; with the texture or fibre of wood.

Lignite.—Wood-coal or fossil-wood, more or less converted into coal; also called *brown-coal*, from the prevailing colour. Some lignites are massive and perfectly mineralized, very like true coal; others quite woody—*wood-coal;* some in thin flakes or leaves, called *paper-coal* (*Lettenkohlen* of the Germans); others soft, earthy—*peat-coal.*

Lignitiferous.—Having lignite or subordinate beds of brown coal.

Ligulate.—Strap-shaped.

Limestone.—All rocks composed chiefly of carbonate of lime are limestones. They vary much in texture and in composition, from admixture of other ingredients: thus chalk is a powdery limestone; ordinary limestone is *compact;* marble is *crystalline* or *sub-crystalline* limestone; the crystals of pure carbonate of lime are called *calcspar;* frequently full of organic remains, and called *shell limestone*, *encrinal limestone*, &c. &c., or with varying admixtures of other ingredients, as *earthy limestone*, *siliceous limestone*, &c.

Limonite.—Mineralogical name for brown iron ore or brown hæmatite; hydrated peroxide of iron.

Limpid.—Clear, transparent.

Line of dip, &c.—The direction in which beds of rock dip. The *line of strike* is the line at right angles to the former.

Lithology and **Lithography.**—*See* PETROLOGY.

Littoral.—Pertaining to the shore; along the shore or near the shore: opposed to *pelagic*, or of deep-sea character; hence *littoral zone*, that between high and low water.

Loam.—A mixture of clay, sand, and vegetable mould; less cohesive than pure clay, more so than sand: said to be *light* or *heavy*, *sandy*, *calcareous*, *gravelly*, &c., according to the composition.

Loch.—*See* LAKE and FJORD.

Lode.—A Cornish term for a regular vein or "course," often metalliferous

Loess.—An old alluvial deposit along the Rhine; a finely divided or even pulverulent loam, generally of yellowish grey colour, chiefly clayey, with an admixture of sand, &c., found at varying elevations up the river valley, to near Switzerland, supposed to be largely composed of glacial mud. Term now applied to similar deposits elsewhere.

Loggan-stone or **Logging-stone.**—Commonly called also *rocking-stones;* great weather-worn masses of granite or gneiss so balanced on their small bases that the application of an ordinary force makes them log or rock on their base.

Longitude.—The distance east or west of a fixed zero or meridian, measured in degrees and parts of a degree. If east of the meridian the place is said to be in *east longitude;* if west, in *west longitude.* In Great Britain and its dependencies the fixed meridian or zero is the Observatory at Greenwich.

Lustre.—One of the distinguishing characteristics of minerals and of rocks: various degrees, such as *splendent*, *glistening*, *shining*, *dull;* or of various kinds, as *metallic*, *vitreous*, *resinous*, *pearly*, &c.

Lydian-stone.—*See* TOUCHSTONE.

Maceration.—The act of soaking a body in cold water.

Macle.—In mineralogy, twin crystals, united by simple contact of one of their faces.

Magnesian limestone.—Any limestone containing more than 20 per cent. of magnesia is a magnesian limestone. Often used, however, as specifying the limestones of the Permian formation.

Magnetic north, or south.—The direction which a freely suspended horizontal needle assumes is the magnetic meridian of that place, as distinct from the true meridional north and south as shown by the sun's shadow at noon. This deviation is variable in different places, and also at different times, and the difference between the magnetic and the true meridian is called the *variation east* or *west.* In parts of the earth this variation is so high as nearly 25 degrees. In no part of India at present does it exceed 2 or 3 degrees, and is therefore of less importance. Dips and strikes are for the most part recorded in magnetic readings, being observed with magnetic instruments; but they are generally plotted in the true meridian, the variation east or west being added to or subtracted from the reading, as may be.

Malleable.—Capable of being hammered out flat, *e.g.* iron, lead.

Marine.—Of or belonging to or caused by the *sea.*

Marl.—A soft admixture of clay and limestone.

Master joints.—A term given to those larger and more persistent planes of division which pass with regularity and parallelism through a mass of beds, as distinguished from the smaller and less regular fissures which affect only a few or even a single bed. *See* BACKS and CUTTERS.

Matrix.—The rock or substance in which any accidental crystal or fossil is imbedded, or in which metallic ores are found.

Meadow-ore.—Another name for bog iron-ore.

Meerschaum (German, "scum of the sea").—So called as it floats on water. A light, white-coloured, amorphous hydrated silicate of magnesia, which is largely used for making the bowls of tobacco pipes.

Mephitic.—Foul or offensive to the smell.

Metallic.—Of or belonging to a metal.

Metalliferous.—Producing metal.

Metallurgy.—The working of metals—smelting, refining, and assaying ores—so as to procure the metals they contain.

Meteoric.—Of or belonging to a meteor, or to the atmosphere. Thus *meteoric erosion* implies that caused by rain, wind, or other weathering forces of the atmosphere.

Meteorite.—General name for any stone or mineral mass which has fallen through the atmosphere; called also *Aërolites.*

Mezozoic.—*See* CAINOZOIC.

Micaceous.—Containing mica in quantity.

Mica schist.—A foliated rock composed of mica and quartz; often but incorrectly termed *mica slate,* as it has not the character of a slate.

Mile.—A common unit of measure in length. Two kinds of mile—the ordinary statute mile, in English consisting of 5280 feet, or 1760 yards; and the geographical or nautical mile, consisting of the 60th part of a degree of latitude, or about 6079 English feet.

Milk quartz.—Vitreous quartz, of a milk-white colour and of a somewhat greasy lustre; also called greasy quartz.

Millstone grit.—Hard gritty sandstone, adapted for use as millstones. In South Wales called the *farewell rock*, as on reaching it you may bid farewell to any profitable seams of coal beneath it.

Mine.—The common name for any underground system of workings or excavations for the extraction of useful minerals, ores, coals, &c.

Mineral.—Lit., any substance obtained by mining or digging. Used also adjectively; as *mineral* kingdom, as distinct from *animal* and *vegetable* kingdoms. *Mineral* in this way is generally synonymous with *inorganic.*

Mineral oil.—Common term for petroleum; called also *rock oil,* or *earth oil.*

Mineralogy.—The science of minerals.

Mocha stone.—A dendrite-marked or "moss agate," so called from being found abundantly near Mocha in Arabia.

Molar.—Like a mill, adapted for grinding, as the *molar teeth.*

Molasse.—Soft, arenaceous greenish body, occasionally intercalated with lignite, which occurs thickly developed in Switzerland, and over large tracts in France, &c., overlying the older Tertiary rocks; divided into three members—upper, freshwater; middle, marine; lower, freshwater.

Molecular attraction.—That force of attraction which holds together the particles (or molecules) of bodies, acting only at small distances; distinct from the attraction or force of gravitation.

Molecules.—The ultimate particles into which a mass can be conceived capable of division without change of character.

Mollusca.—Lit., soft animals. One of the large divisions of the animal kingdom, including all those animals with soft bodies, and no, or only a very imperfect, internal support or skeleton. Includes all shell-fish.

Monad.—Supposed to be the most minute form of animal life. Ehrenberg says that a monad is not more on an average than $\frac{1}{24000}$ part of an inch, so that a single drop of water might contain five hundred millions!

Monoclinal.—Beds are said to be monoclinal, or to have a monoclinal dip, which extend indefinitely in one direction with a continuous inclination.

Monolith.—Made of one stone, such as pillars, posts. Obelisks are said to be monoliths, or to be monolithic, when formed of a single piece.

Monsoons (Arabic, "season").—The periodical or seasonal winds of the Indian Ocean and adjoining countries.

Moraine.—The mounds of stony detritus which occur along the bases and edges of glaciers.

Morass.—A swamp, marsh, or area of low wet ground, and partially filled-up hollows or depressions, or old lakes, either freshwater or saltwater.

Morphology.—Lit., science of form. Treats of the definite form of living beings, as made up of organs. *Physiology*, on the other hand, treats of the functions or vital actions performed by these organs.

Mountain.—Any part of the earth's surface which rises considerably above the general level. Small rises are called hillocks; those a little larger, hills; while the term mountain is seldom applied to elevations of less than 2000 feet or so.

Mountain limestones.—A common English term for the carboniferous limestone. First introduced in north of England, where this rock forms the higher ground and hills.

Mud.—All wet, fine-grained, slimy débris is called *mud;* may be earthy, calcareous, volcanic, &c. Indurated mud becomes shale.

Mudstone.—A fine-grained shaly stone, hard enough when dry, but rapidly returning to the state of mud when exposed to wet.

Muschelkalk.—Lit., shell limestone. The German name for the middle division of the Triassic system.

Mussel bind or band.—A miners' term for the thin shelly bands occasionally found in the Coal-measures; made up chiefly of shells analogous to the existing freshwater kinds.

Nacreous.—Pearly; with pearly or iridescent lustre.

Nadir.—The point vertically under the feet of any person, or diametrically opposite to the *zenith* or point directly overhead.

Nagelflue.—A soft arenaceo-calcareous conglomerate (Middle Tertiary), so called from the pebbles in it appearing like flights or swarms (*Flüge*) of nail-heads (*Nägel*); is said to be more than 6000 feet thick at the well-known Righi (Switzerland).

Naphtha.—Thin, volatile, fluid, bitumen; obtained from natural springs; also by distillation from coal-tar—sp. gr. ·75—boils at 160°, &c. *See* BITUMEN.

Native.—As used in mineralogy, implies a state of purity or absence of mixture; as, *native copper*, *native gold*. There is, however, generally more or less impurity.

Natron.—Native carbonate of soda.

Needles.—Term used for pointed hilltops—*aiguilles* of the French; also for isolated pointed masses of rocks detached from the cliffs along shores, as the Needles off the Isle of Wight.

Neocomian.—Belonging to Neufchâtel (Neocomium in Latin). Name given to the lower division of the cretaceous formations, from their well-marked occurrence near that place.

Nephrite.—*See* JADE.

Neptunian.—Term applied to stratified or aqueous strata, as opposed to Plutonic or igneous rocks.

Ness, Naze (nose).—A termination often found in the names of places in north of England, &c., implying a projection of land into the sea; as, *The Naze*, *Dungeness*, *Fifeness*, &c.

Nevé.—A mass of snow partially converted into ice, from which a glacier generally takes its rise.

New Red or New Red Sandstone.—Name given in contradistinction to *Old Red*, one occurring above the carboniferous, the other below. *See* TRIAS.

Nitre.—Common name of nitre of potash, or saltpetre.

Noble.—Term used in mineralogy to express superiority or purity; as, *noble opal*, *noble tourmaline*.

Nodule.—Any concretion of rock matter, aggregated round some nucleus (organic or inorganic), such as *flint nodules*, *nodules of ironstone*.

Normal.—According to rule or law; ordinary; of regular occurrence.

Northern drift.—Another name for the *Glacial drift* or *Erratic block group*, as occurring chiefly in the northern latitudes.

Nucleus.—Lit., a little nut or kernel. Applied to the centre round which any mass is aggregated.

Nugget.—Irregular lumps or pellets of gold, found of varying size in the auriferous drifts.

Nullah or **Nala.**—Hindostani name for a small stream or brook. Generally heavy torrents during the rainy season, and dry sandy channels in the dry weather.

Oasis.—A green and fertile spot in a desert, due to existence of a spring producing moisture.

Oaze or **Ooze.**—The soft, slimy, sticky mud found covering large areas of the sea bottom.

Oblate.—Flattened or spread out; applied to spherical or nearly spherical bodies flattened slightly at two opposite sides, like an orange. The form of the earth is that of an *oblate* spheroid, differing from a true globe or sphere by a flattening at either pole to the extent of about thirteen miles.

Obsidian.—A volcanic glass, nearly opaque.

Occipital.—Belonging to the *occiput*, or back part of the head.

Ocean.—The great body of water which covers about three-fourths of the general surface of the earth.

Octahedral.—Having eight equal sides.

Odontology.—The science of the teeth.

Odour.—Used as a characteristic of minerals, many of which when moistened, breathed on, or struck, give out peculiar odours; *argillaceous, fetid, sulphurous*, &c.

Oil coals, Oil shales.—Coals or shales which yield a considerable amount of oil on distillation, pass into each other by many gradations.

Old Red or **Old Red Sandstone.**—The red sandstones which occur below the carboniferous rocks, so called as distinctive from those occurring above, denoted the *New Red.*

Opalescent.—Having an opal lustre; displaying a play of colours; iridescent.

Open cast.—Working a mine or quarry by workings open to day; without sinking shafts.

Ore.—When metals occur in nature in a state of comparative purity, they are called *native;* when combined with other matters, so that they require various processes for their separation, the combined mass is called an *ore.* The principal combinations are with other metals, with sulphur, with oxygen, with acids, forming carbonates, phosphates, &c.

Organic.—Produced by organs; applied to animals and plants, as distinguished from minerals, which are called inorganic, not being furnished with organs of growth. *Organic remains* is thus synonymous with the restricted use of fossils, a general term for all remains of plants or animals found imbedded in rocks.

Orography.—The description of the mountains and mountain systems of the globe.

Õsar Os.—The Swedish term for the same features called *escars* in Ireland and *kaims* in Scotland; long low hillocks or mounds of gravel, for the most part presenting a larger slope and a partially scarped side. The long slope in these latitudes is towards the north, from which the gravels have come.

Osseous.—Bony; containing bone, or resembling bone.

Osseous breccia.—Common name for the rock or mass found in caves and elsewhere, in which fossil bones are cemented together by calcareous and other matters, forming a hard breccia.

Ossiferous.—Yielding bones; containing bones; as, *ossiferous caves*, *ossiferous gravel*, &c.

Ossified.—Converted into bone.

Osteology.—The science of bones; a branch of comparative anatomy.

Outcrop.—The line of junction of any bed of rock with the surface of the earth; called also *crop*, *basset.* Beds are also spoken of, especially by miners, as *coming to day*, *rising to the grass*, &c. Not to be confounded with the *strike.*

Outliers.—*See* also INLIERS. Portions of any formation or rock separated from the main mass of the same formation by the intervening portions having been removed.

Overlap.—The greater extension of the upper beds in a series by which they overlap or conceal the edges of those on which they rest; often accompanied by unconformity, but not necessarily.

Pack ice.—*See* ICE-PACK.

Palæozoic.—*See* CAINOZOIC.

Paper-coal.—A variety of brown coal or lignite deposited in thin layers or leaves like sheets of paper.

Paroxysm.—A sudden and violent effort.

Paroxysmal.—Produced by or resulting from such an effort.

Parrot coal.—The usual Scotch name for *cannel coal*, so called from its chattering like a parrot when heated, or crackling in the fire.

Particles.—The smaller parts, or granules, composing any mass, such as the particles of sandstone, &c.

Parting.—A thin subordinate layer, parting or separating two main beds. Partings of shale often occur in coals.

Pavonine.—Like a peacock; showing iridescent colours; used as descriptive of the lustre or colour of ores, &c. *Peacock ore* is a term often used to express the same thing, as *Peacock copper*, &c.

Pea grit.—A grit composed of rounded or oval concretionary masses like peas; often like crushed peas.

Pearlstone.—A variety of lava, composed of a number of little globules, of varying sizes, with a pearly lustre externally; passes into *pitchstone* and into *pumice*.

Peat.—The common English name for the accumulation of the remains of marshy plants, which annually grow and decay in bogs or swamps; varies in structure, from the fibrous and scarcely decayed turf of the surface to the dense black mass which is found under true pressure at the bottom of the marsh.

Pedunculate.—Supported on a stalk; opposite to *sessile*.

Pegmatite.—A binary granite of quartz and felspar; often passes into graphic granite, from the peculiar arrangement of the crystals, which bear some resemblance to Hebrew characters.

Pelagic.—Produced and formed in the deep sea; opposed to *littoral*, belonging to the shore, or *estuarine*, formed in an estuary. *Pelagic animals* are free-swimming animals which frequent the open ocean.

Pellicle.—A thin skin or covering.

Penarth beds.—A term used in England for the beds which form a passage between the Trias and Lias; so called from their occurrence at Penarth, in Somersetshire. *See* RHÆTIC BEDS, KÖSSEN BEDS, AVICULA CONTORTA ZONE, &c.

Peperino.—An Italian name for a volcanic rock, formed by the cementing together of sand, cinders, &c., like a tufa. Generally, in Italy, restricted to the brown basaltic tufas.

Perched blocks (*Blocs perchés*).—The detached masses of rock brought from a distance and left perched, by ice action, on the surface of other rocks; often on the very summits and brows of hills.

Percolate.—To pass or strain through a porous mass.

Permeable.—That can be passed through; admitting the passage of water.

Permian.—The formation immediately overlying the Coal-measures.

Petrify.—To turn into stone. *Petrifaction*, something turned into stone. This change is caused by the stony matter, in solution, passing into the pores of the organic tissues, and, as the organic matter decays and is removed, gradually taking its place, until the whole mass becomes impregnated with the stony matter.

Petrography.—*See* PETROLOGY.

Petroleum.—Rock oil or mineral oil. *See* BITUMEN.

Petrology or Petralogy.—The study or science of rocks. *Petrology* and *lithology* are two terms which have been very loosely used; but *petrology* and *petrography* should be (and are now generally) restricted to the study of rock masses *in situ*, while *lithology* and *lithography* are retained for the description and study of hand specimens and the microscopic structure of rocks.

Petro-silex.—Rock-flint, that is, flint occurring in the form of a rock-mass, not in detached nodules, as chert; another name for *hornstone*.

Pfahlbauten.—Pile dwellings; the German name for the prehistoric wooden dwellings, of which remains occur plentifully in some of the lakes of Switzerland. The *Crannoges* of Ireland. Called also *Lake-dwellings.*

Phytology.—The science of plants, or botany; hence palæphytology, the science of ancient or fossil plants.

Phytophagous.—Plant-eating; opposed to *zoophagous*, animal-eating.

Pisiform.—In small concretions like peas.

Pitchstone.—A glassy trappean rock. So called from the pitchy look of the fresh fracture, generally blackish or dark green. Passes into obsidian and pearlstone.

Plaster of Paris.—The white powder which results from the burning of gypsum, or sulphate of lime. This on being heated loses its water crystallization, and the powder thus formed, on being again mixed up with water into a paste, reassumes part of this water, and thus hardens into a cement, of very general use.

Plastic.—Capable of being moulded into any form, which is retained.

Plate.—A miners' term for compact shale, which divides into plates. Confined to the north of England.

Plateau (Fr.).—Used to express a table-land of higher level than the surrounding area.

Pleistocene.—Lit., most recent or new. In which the organic remains belong mostly, or almost entirely, to recent or existing species. The newer Pliocene of some writers.

Pliocene.—Lit., more recent or new. In which the organic remains have a larger proportion of recent species than of extinct.

Plumbago.—Another name for graphite, from its resemblance to lead. Called also BLACK-LEAD.

Plumbiferous.—Containing or yielding lead.

Plutonic.—Applied to rocks supposed to have been formed by igneous action, at some depth beneath the surface; as distinct from *volcanic*, formed at or near the surface.

Pluvial.—Appertaining to rain. Thus the phrase is often used of *pluvial agency*, *pluvial denudation*, &c.

Poikilitic.—Lit., variegated. A name formerly given to the New Red formation, from the variegated colouring of the beds. Sometimes used to include the Triassic and Permian rocks.

Poles.—The extremities of the imaginary line or axis on which the earth rotates—the Arctic or northern, and the Antarctic or southern.

Porcelainized.—A term used to express the peculiar porcelain-like aspect which clays, shales, &c., assume when heated or baked like potter's clay, &c.

Porcellanite. — A rock of that hard, close, fine-grained texture which results from baking; clays converted into a jaspery or hard porcelain-like mass of various colours and composition.

Porphyritic.—Like porphyry, or with the aspect of porphyry, &c.; that is, having distinct and larger crystals imbedded in the general matrix or mass of the rock.

Porphyry.—Any rock containing imbedded crystals, chiefly of felspar, distinct from the general matrix; name originally given to a *red* or *purple* rock found in Egypt, now applied to rocks of any colour, and intended to convey the idea of structure only.

Potato-stones.—The quarryman's common name for the rounded irregular concretions, often hollow and lined with crystals. The *geode* of mineralogists.

Potstone.—A soft magnesian rock, chiefly chloritic, often used for fashioning into pots and plates or dishes; is a course granular variety of the finer soapstone.

Pozzuolana.—A volcanic ash, which occurs largely near Pozzuoli, in the vicinity of Naples. It contains about 20 per cent. of iron, and a little lime, and forms an admirable cement, setting rapidly under water.

Precious.—Used by mineralogists to imply the finest or firmest varieties of gems or minerals, such as *precious garnet*, *precious beryl*, &c. The term *Oriental* is frequently found used in the same sense, from the old idea that the gems came principally from the East.

Precipitate.—When such a chemical change is produced in a solution that solid matter is thrown down, it is said to be *precipitated*, and is called a *precipitate*. When, on the contrary, substances held mixed up with or in mechanical suspension in a fluid, fall down by their own gravity, they form a *sediment*.

Preternatural.—Beyond natural, extraordinary, or beyond the ordinary course of things, but still possible, without having recourse to the idea of being miraculous; while *supernatural* implies something above or entirely beyond the action of ordinary laws.

Primitive or **Primary.**—A term used by the earlier geologists to include the older crystalline rocks, supposed to have been formed at the first, or in the primitive state, of the globe; now generally abandoned, as many of these rocks are proved to be of subsequent and very varied dates.

Protogene.—Talcose granite—a compound of felspar, quartz, and talc; so called from an idea, proved to be erroneous, that it was the first-formed or oldest variety of granite.

Prototype.—The first or original form, after which others were copied or formed.

Psammite.—A French term for fine-grained clayey sandstone, in which the component grains are scarcely distinguishable by the unassisted eye.

Pseudo-morphs.—Substances found in the crystalline forms of other minerals, evidently filled into moulds or casts left by the removal of the original crystals; the result of chemical substitution of one material for another.

Plum-pudding stone or **Pudding-stone.**—Originally applied to a rock occurring in Herefordshire, composed of dark flints imbedded in a light-coloured matrix or paste, which when sliced was supposed to be like a cut of a plum-pudding, the flints representing the fruit: term now applied to any coarse conglomerate, but becoming obsolete.

Pulley-stones.—Common name for the hollow casts or moulds of the joints of encrinite stems.

Pulverize.—To reduce to powder or dust.

Pumice.—Volcanic froth; a porous spongiform lava, so vesicular that it floats in water; used largely as a polishing material.

Pumiceous, Pumiciform.—Having the nature of pumice, resembling pumice.

Pyrites.—Sulphides or sulphurets of iron, copper, &c. *Pyrite* is now restricted by mineralogists to the sulphide of iron—a very common mineral.

Pyritiferous.—Containing pyrites.

Pyrogenous. — Fire-produced; nearly synonymous with *igneous.*

Quaquaversal.—Turned on every side, dipping on all sides from a common centre or axis.

Quartz.—Crystallized silica; rock crystal.

Quartziferous.—Producing quartz; *quartzose*, abounding in quartz.

Quartz-rock, Quartzite.—The bedded layers in the metamorphic rocks, which have a granular crystalline texture, as distinct from the truly crystalline vein-quartz; and *quartzite* is applied to sandstones so indurated and altered by pressure and heat that they assume the look of quartz-rock.

Quaternary.—All beds above the true *Tertiaries* have been called by some geologists *Quaternary.*

Quicklime.—The result of burning limestone (carbonate of lime), and so driving off the carbonic acid, is a mass of oxide of calcium, which on being moistened falls to powder, with evolution of great heat. It is called quick from being very caustic and destructive.

Quicksilver.—A familiar name for mercury, from its silver-white colour.

Rag.—A provincial English word for any hard, coarse-textured rock.

Rake-vein.—In mining, a fissure, filled with mineral, either vertical or highly inclined, which rakes or cuts through all the lodes indifferently.

Rauchwacke.—One of the upper groups of the Permian formation, so called from its dark colour (*Rauch*, smoke).

Ravine.—A deep steep-sided gorge.

Recent.—In geological classification *recent* is applied to whatever has occurred or been formed since the Glacial period.

Reef.—A ridge. Usually applied to any ridge of rocks in the sea only partially covered; as, *coral reef.* A *shoal* or *bank* is of soft material, sand, mud, &c., and generally wider than a reef.

Refractory.—*See* FUSION.

Regur.—The name given to the black cotton-soil of India, which covers immense areas. It is obviously of alluvial origin, of black or greyish-black colour, and varies very materially in thickness and in composition.

Reliquiæ.—Remains; what is left; applied to all organic remains—animals, plants, &c.

Reniform.—Kidney-shaped.

Reticulated.—Like network; interlaced.

Reversed.—Turned upside down; turned the wrong way. A *reversed* shell is one whose aperture is turned to the left hand, when the mouth is placed before the spectator, with the apex of shell upwards. *Reversed fault.—See* FAULT.

Rhætic beds.—The passage beds between the Trias and Lias —called so from their large development in the Rhætic Alps; called also, *Penarth beds, Kössen beds. See* AVICULA CONTORTA ZONE.

Ripple mark or **Rippling.**—A ridgy or wavy surface produced on the surface of sands by the tide, &c.; also produced by the passage of any gentle current, whether of wind or water. Often found preserved in some of the hardest sandstones.

River basin.—The entire area drained by any river.

Roadstead, Roads.—An open anchorage, where ships can lie.

Roches moutonnées.—Projecting masses of rock, which have been worn down and smoothed by glacier or ice action until they assume the rounded smooth appearance of a *sheep's back.*

Rock.—A stony mass, but technically is applied by geologists to any substance, whether soft or hard, loose and incoherent or indurated and compact, which forms a portion of the earth's crust.

Rocking-stones.—*See* LOGGING-STONE.

Rock-salt.—Salt (chloride of sodium) in the form of a rock-mass.

Roestone.—A familiar English word for fine-grained oolites, which, being composed of an aggregation of rounded grains, chiefly of same size, offer much resemblance to the roe of a fish.

Roof.—In mining, the stratum or bed immediately overlying the workable coal, and which forms the roof to the galleries; the bed underneath is called the *floor.* In metallic mines the upper or hanging wall of the vein is sometimes called the *roof.*

Rothetodteliegende (German).—Lit., red dead layers. The name given to the red layers (sandstones) which lie under the copper slate; they are called *dead* because they contain no copper, or are non-metalliferous.

Rotten-stone.—The result of the decomposition of siliceous limestones by the removal of the lime by percolation of water, the finely distributed particles of silex remaining as a spongy earthy mass. Used largely as a polishing material.

Rubble.—Any loose accumulation of angular (not water-worn) fragments of stone.

Rust.—The powdery oxide which covers the surface of metals when exposed; generally confined now to the red oxide, which forms on iron so exposed.

Saccharine.—Resembling sugar. *Saccharine marble* is finely crystalline statuary marble (as Carrara marble), so called from its resemblance to loaf-sugar.

Saddle-back.—A term often applied to an anticlinal ridge, from the beds dipping, and with sides like a saddle.

Saliferous.—Yielding salt. The term *saliferous system* was once used in English geology as synonymous with the New Red Sandstone, as this was the great repository of salt and salt-springs in England.

Saline.—Containing salt, as *saline springs.*

Salses.—Small orifices throwing out hot acidulated mud, often accompanied by steam or other gases.

Salt.—Commonly used as meaning common salt, which is a chloride of sodium. In chemistry a salt is generally any combination of an acid with a salifiable base.

Saltpetre.—Or nitre; nitrate of potash.

Sand.—Worn particles of previously existing rocks reduced into small grains. Ordinary sand, without qualification, implies grains of quartz, which is by much the most prevalent material for sand; but when there is a large admixture of fragments of shells or corals, &c., the sand is distinguished as *shell sand*, or *coral sand*, &c.

Sand-drift.—Sand driven by the winds; hillocks, ridges, or dunes of sand which occur in many parts of the shore.

Sandpipes, Sandgalls.—Cylindrical or pipe-like hollows or tubes in rock, common in chalk, and filled in with sand and clay from above.

Sandstone.—Lit., stone formed of sand. Consolidated sand, either compacted by pressure, or cemented by some material which fills in the pores of the mass.

Saponaceous.—Like soap ; having a soapy feel.

Sarsen-stones.—Another name for *Druid stones* or *grey wethers;* which see.

Saturated.—Full to overflowing. A saturated solution is one that can take up no more of the matter dissolved.

Scales.—Hard plates formed on the exterior surface of animals; they are almost always of horn, or horny.

Scar or **Scaur.**—A bluff precipice or face of rock.

Scarped.—Cut back so as to form a steep face.

Schist.—A metamorphic foliated rock, splitting imperfectly or roughly, not so regularly or perfectly as slate. *Mica schist, chlorite schist, schistose gneiss,* are all crystalline schists.

Scoria.—Lit., the scum or dross which forms on the surface of a fused mass; this breaks up into cinder-like fragments, and hence *scoria* is applied to all ashes, dust, cinders, &c., thrown out of volcanoes.

Scutes.—Differ from scales in being formed in the flesh of the body immediately under the skin; they are always composed of true bone.

Seam.—Term often used for thin beds; as, *seams of coal,* &c. Properly is only a thin layer separating or seaming the main bed.

Sectile.—Capable of being cut with a knife, without breaking off in pieces.

Section.—A cutting through, so as to expose the structure. Geological sections are representations on paper, either of what is seen in such natural cuttings as exist on earthy surfaces, or of what is supposed to be the structure and arrangement of the rocks over any area represented.

Secular.—Including several secula or ages, therefore applied to operations spread over any long periods, or which only become appreciable in the course of ages.

Sediment.—Anything settling down from suspension in water. *Sedimentary rocks* are rocks made up of sediment, loosely applied to all stratified rocks.

Seismography.—The description of earthquakes.

Seismology.—The science of earthquakes.

Seismometer.—An instrument for measuring the force of an earthquake.

Septarium.—Argillaceous, calcareous, or ferruginous nodules divided into numerous portions by septa or divisions. These cracks probably arose from shrinkage of the mass while consolidating, and are generally filled in with different, and often strongly contrasting, minerals, sometimes called, from shape and markings, *turtle-stones*, *beetle-stones*.

Septum (pl. *septa*).—Divisions.

Series.—Applied to a number of similar or allied objects, arranged in sequence; a set of strata possessing some common characteristic, such as *Chalk series*, *London clay series*.

Sessile.—Seated, applied to animals or plants which are closely attached to other objects, instead of being supported on a pedicle or foot-stalk; opposed to *pedunculated.*

Shale.—Any argillaceous mass having a laminated structure or that shells off, this tendency being the result of original deposition in thin layers. Slate, on the contrary, owes its facility in splitting to a structure superinduced by great pressure.

Shell.—A hard covering to some softer material, but specially applied to the hard calcareous coverings of the mollusca. From the abundance of shells and portions of shells we have *shell-sand*, *shell-marl*, *shell-mounds*, &c.

Shingle.—Loose, partially rounded stones and pebbles, properly without any finer mass; distinct in those respects from gravel and sand.

Shoading or **Shoding.**—A miners' term for tracing up the occurrence of ore or veins by following up the bed of a stream or valley in which they occur. The fragments become more frequent as the vein from which they are derived is approached, while they cease to occur above that vein.

Shoal.—A part of the area covered by water, of the sea, or lake or river, when the depth is little; a bank always covered, though not deeply.

Silex or **Silica.**—One of the most abundant ingredients of the rocky masses which form the crust of the earth; the earth or oxide of silicon; occurs nearly pure in quartz, rock crystal, &c. Often called silicic acid, because it combines with many bases in definite proportions, and forms silicates.

Siliceous.—Abounding in silex; with a flinty structure.

Siliceous-sinter.—A siliceous deposit from springs holding silica in solution.

Silicified.—Filled with silica converted into silica by infiltration or otherwise.

Sill.—Lit., the threshold or flat stone forming the door sill. Applied to a flat-bedded layer of hard rock such as the *whin sill*, a sill or layer of trap or whin which occurs in the Mountain Limestone.

Sinistral.—*See* DEXTRAL.

Sinter.—A compact deposit from water, either of siliceous or calcareous matter; differs from *tuff* or *tufa* in being close-grained and compact.

Slate.—Any rock that can be split into thin layers; the term is now strictly limited to rocks in which this facility of splitting is due to *cleavage*, the result of pressure.

Slaty.—Like slate, having the structure of slate, loosely applied; as, *slaty clay*, *slaty coal*, &c.

Slickensides.—The term used to express the scored or striated polished surface of a fault, apparently the result of intense friction.

Slide.—Mining term for small dislocation or fault, when one side of the fissure appears to slide on the other. *See* HEAVE.

Slime.—Soft adhesive mud.

Slip.—A dislocation or fault, one side appearing to slip away from the other.

Slope and Counter-slope.—Most mountain-chains have on one side a long, comparatively gentle, and continuous rise, called their *slope*, and on the other side a comparatively sudden or rapid slope, called the *counter-slope*.

Seyne.—Synonymous with BOND.

Smudge coal or Blind coal.—Coal partially deprived of its bitumen, and converted into a sort of natural coke, by the contact of heated masses, such as trap-dykes, &c.

Snakestone.—*See* AYRSTONE.

Snow-line.—The line or elevation at and above which the ground is constantly covered with snow. This elevation varies with latitude of place, and also with season.

Soil.—The superficial covering of earth, in which plants grow, the result of decomposition of the more solid rocks mixed with vegetable and organic matter.

Solfatara.—A volcanic orifice from which sulphurous vapours, mud, and steam are ejected.

Spar.—Any mineral breaking up with regular smooth faces, and tolerably bright in lustre, is commonly called a *spar;* as, *calcspar, felspar*, &c.

Species.—An assemblage of individuals so resembling each other as to be probably all sprung from one common stock.

Specular.—Like a mirror, having smooth brilliant surfaces reflecting more or less perfectly.

Splint coal.—A variety of coal forming hard laminæ, which on fracture split or splent into flaggy layers: a Scotch term.

Spoondrift.—A sailors' name for the driven or drifted spray of the sea. When the force of a tempest becomes very intense it absolutely quells or cuts off the waves, and scatters the water in a heavy blinding shower, called *spoondrift*, often driven for scores of miles inland.

Spring.—General name for a discharge of water from the earth. Some are mere outlets of drainage water—these are *surface springs;* others are constant discharges of large quantities of water from a considerable depth—these are said to be of *deep-seated* origin. Springs are hot or cold, pure or highly mineralized, according to the nature of the water poured forth.

Squamous.—Scaly; covered with scales; arranged like scales.

Stalactite, Stalagmite.—The icicle-like masses of calcspar, or other minerals, formed by the deposition from dropping of water holding these minerals in solution. When attached to the roof of the cavity in which they are formed, they are called *Stalactites;* when formed on the floor, they are called *Stalagmites.* The two frequently go on forming until they meet, and so form a pillar or a sheet of this stalactitic matter.

Stanniferous.—Holding or yielding tin (*stannum*).

Stellate.—Star-like; arranged like the rays of a star, or radiating from a common centre.

Stinkstone.—Limestone which when struck or rubbed emits a fetid odour; often called *swinestone.*

Stratification.—The arrangement in strata or layers or beds common to all rocks the materials of which have been deposited by water. As first formed, these beds or strata must be to a large extent horizontal, or nearly so, and parallel one to the other. When this is not the case, the beds have been, subsequently to their formation, disturbed. *False stratification* or *bedding*, or, as it is frequently called, *oblique lamination*, is a term applied to the structure produced when the minor layers or laminæ of which a main bed is composed have been either drifted over the sloping edges of a bank, or been shifted about and redeposited in minor and irregular layers, thinning out and thickening irregularly.

Stratum (pl. *strata*).—Something strewed out or spread out; a layer of material.

Streak.—In mineralogy, when a mineral is scratched with a harder mineral, or instrument, the colour of the scratch is called the streak. This is often quite different in colour from the mineral itself, and as it is tolerably constant in each variety, it forms a good distinguishing mark.

Stream tin.—The rolled fragments of tinstone found in gravel and other detritus.

Stream works.—The general name for workings for metallic ores in gravels, clays, drifts, &c., from which the ores are obtained by washings, as distinguished from mining or mine works, in which the ore is obtained from the solid veins. These metalliferous drifts are nothing but the débris of the more solid rocks worn down through a long space of time from the higher grounds.

Striated.—Streaked, or marked with fine thread-like striæ, parallel or nearly so to each other. When these markings become larger and more distinct, the surface is said to be *furrowed*, *channelled*, or *grooved.*

Striation.—The marking with lines or striæ, generally applied to the parallel scratches with which the bed of a glacier is scored by means of sharp angular fragments of rock imbedded in the ice-stream, which are forcibly dragged along with the ice. These imbedded masses are also striated and polished, often only on one side, but more generally on more than one, owing to their having been turned over and over in their journey.

Strike.—The line on the surface of a bed which is horizontal or at right angles to the dip or inclination of the bed. It is not the same as the line of outcrop, though often erroneously so described—the outcrop being the line of intersection of the edge of the bed with the surface, the line along which it "outcrops," or "comes to day."

Structure.—The condition or form in which rock-masses are arranged; as, *tabular*, *laminated*, *massive*, *columnar*, &c. *Texture*, on the other hand, is the condition in which the component particles are arranged; as, *compact*, *crystalline*, *porous*, &c. *Composition*, again, is the amount of the various elementary substances which go to make up the mass.

Sub-aerial.—Under the air; in the atmosphere.

Sub-aqueous.—Under the water. Phenomena which take place under the sea or under water are denoted *sub-aqueous.*

Submarine.—Under the sea.

Submergence.—A putting under water: applied to sinkings of the land, which bring the surface below the level of the waters.

Subsidence.—A sinking or setting down of part of the earth's surface. The land may subside suddenly or very gradually —over a very large area, or locally, &c.

Subterranean.—Under the earth; concealed beneath the surface of the earth: as, *subterranean passages*, &c.

Sulcated.—Marked with sulcæ or furrows.

Sump.—A pit or well; generally a continuation of the shaft in mines, into which the waters of the mine are conducted by channels, and from which they are pumped. The size or depth of the sump will of course depend on the amount of water met with, facility of pumping, &c.

Superficial.—Near or on the external surface. *Superficial accumulations* is a term often applied to the loose masses of soil, sand, gravel, &c., which occur at the surface of the earth, and cover the more solid rocks.

Superposition.—A placing above; an arranging in regular succession one over the other.

Swinestone.—*See* STINKSTONE.

Synchronal or **Synchronous.**—Occurring at the same time; contemporaneous; of the same date.

Syncline or **Synclinal.**—Beds dipping from opposite directions inwards, towards a common axis.

System.—In geology, this word is applied to any series of groups of strata which have such a general connection, sequence or relation as indicates that they all belong to one great period or sequence of events, such as the *Silurian System—Carboniferous System.*

Tabasheer.—The siliceous secretion often found near the joints of bamboos. It forms starch-like or milky secretions of pure silica. The thin hard skin or pellicle which coats the stems of bamboos and many other grasses is also of silica.

Table-land.—A comparatively flat or level tract, raised above the general level of the country.

Tabular.—Arranged in table-like masses, or flat square blocks.

Talus.—Originally used in fortification to denote the sloping side of a wall or rampart: used in geology for the sloping accumulations of detritus which form at the base of cliffs, derived from the wasting and breaking up of the rocks above.

Tarai or **Terai.**—An Indian term for the belt of swamp and jungle which lies at the foot of the Himalaya and other hills in that country.

Taste.—In mineralogy, taste is used as a distinguishing characteristic of those minerals which have any taste if applied to the tongue. *Bitter*, *saline*, *astringent*, *cooling*, *earthy*, are all different kinds of tastes.

Tchornozem.—Lit., black mould: the local name for the black earth which covers the whole of the Aralo-Caspian plain, and much of the South of Russia in Europe; interesting from its close resemblance to the Regur or so-called cotton soil of India. It is evidently one of the most recent deposits, and of alluvial origin.

Terrace.—A bank or shelf of land having a uniformly flat surface. These may be ancient sea margins or raised beaches, lake terraces, or river terraces—shelves formed along the banks of lakes or rivers when the waters stood at a different level from their present one.

Tertiary.—Belonging to the third or Upper system of the stratified rocks, including all above the Chalk.

Tesselated.—Divided into small *tesseræ* or square or lozenge-shaped pieces.

Texture.—*See* STRUCTURE.

Thermal.—Warm; as, *thermal springs*, &c.

Thin out.—A geological term used to express the gradual diminution in thickness of a bed of rock until it disappears. A *thinning out* is the natural termination of a stratum.

Throw.—When beds of rock are faulted, one side of the fault being shifted or thrown out of its original position, the *throw* is the amount of vertical displacement, and the fault is said to be a *down-throw* or an *up-throw* according to the original position of the rock.

Thrust.—The breaking down of the roof of a gallery or opening in a mine from the superincumbent pressure of the rocks above is called a *thrust*. *See* CREEP.

Tilestone.—A name given to any stone which readily splits into thin layers suitable for roofing purposes.

Till.—A Scotch term for the stiff unstratified clays of the Boulder drift, and often for any thick unstratified clay.

Tilt.—Tilted up. When beds are suddenly bent up or thrown down at a stiff angle, they are said to be *tilted*.

Tincal.—Natural borax.

Toadstone.—A name given by the miners in Derbyshire to some trap rocks which occur with the limestone of that county,—of varying composition and texture;—takes its name from the German *Todtstein*, or dead stone, because it is dead—that is, does not produce lead, like the limestone. Many mining terms are derived from the German.

Touchstone.—A kind of compact siliceous slate, also called *Lydian-stone:* used for testing gold; the purity or impurity of the metal being judged from the colour and character of the streak left on the stone; hence *touchstone*.

Transition.—A going between or passing from one to the other; hence beds or rocks which form a passage from one group or character to another are called *transition beds*, partaking partly of the characters of both.

Translucent.—When bodies are sufficiently clear to admit light to pass through them, but not in sufficient quantity to show the forms of objects, they are called *translucent;* when they admit light to pass through so freely that the form and colour of objects can be distinctly seen, they are called *transparent.*

Trap, Trappean (from *trappa*, Swedish for "a stair").—Name originally given to greenstone and basaltic rocks, which, occurring in tabular or flat-topped successive flows, formed at their edges step-like masses. The word is now used as a generic term to include generally all igneous rocks which are not granitic or not purely volcanic.

Travertine.—Concretionary limestone, deposited from the waters of springs, rivers, &c.; generally compact, hard, and sub-crystalline, and so differs from calc-tuff, which is porous.

Trias.—The New Red Sandstone. Originally a German term, but now generally adopted; so called because the formation is in Germany divided into three parts—the *Keuper*, *Muschelkalk*, and *Bunter.*

Tributary.—Any stream or river which either directly or indirectly falls into another is said to be a *tributary.* If it falls directly into the other stream, it is said to be an *affluent*—that is, every affluent must necessarily be tributary, but every tributary is not necessarily an affluent.

Trilobita.—An extinct order of Crustacea only found in Palæozoic rocks; so called from the body being divided longitudinally into *three lobes* or swellings.

Tripoli.—A fine polishing powder; so called from having been originally found at Tripoli: composed entirely of the siliceous skeletons of infusoria and diatoms.

Trituration.—*See* LEVIGATION.

Trouble.—Any faulting or disturbance of the strata by which the regularity of working in a mine is interrupted is called by the miners a *trouble.*

Trough.—Commonly used in geology to express any sudden or limited depression or folding of the beds, by which they assume the form of a synclinal or basin.

Tubbing.—In mining, is technically the lining of wood or iron put into a shaft or pit to prevent the falling in of loose materials, or to exclude the water that would come in from the sides; often most costly and troublesome.

Tufa or **Tuff.**—Any porous vesicular compound, such as calc-tuff, volcanic tuff.

Turbinated.—Shaped like a top. *Turbinated shells* are those which have a spiral, top-like form.

Turkey slate.—Name commonly given to fine whetstone, because some of the best varieties come from Turkey.

Turtle-stone.—Name commonly given to *septaria*, from supposed resemblance to the shell or carapace of a turtle.

Umbo.—A boss or protuberance. The *umbo* in shells is the knob-like or boss-like point of a bivalve shell, situated close above the hinge.

Umbonated.—Bossed.

Unconformable.—Beds or strata which lie parallel on each other are said to be *conformed* or *conformable;* but where one set rests upon the upturned and worn edges of another set, they are said to be *unconformable.* This necessarily implies a lapse of time, because the lower beds must have been formed, have been consolidated, and then tilted and possibly exposed for some time to denuding forces before the upper beds were deposited on them; the fact of their being thus unconformed is called *unconformity* or *unconformability.*

Unctuous.—Greasy. The feel of many minerals is greasy or unctuous. Most magnesian minerals have this feel; and this is used as a distinguishing characteristic. This feel is entirely distinct from that of mere smoothness.

Underclay.—The term used for the beds of clay which most commonly are found under coals. They appear to have been the soils in which the plants, the decomposition of which forms the coal, existed and grew.

Undercliff.—The lower cliff or terrace formed where the upper part of a cliff has fallen or slipped down.

Underlie.—The inclination of a mineral vein: thus, they are said to underlie to the north or south, or whatever point of the compass the inclination tends to; the amount of the underlie being the angle formed with the vertical. *Dip* is the angle formed with the horizon: thus, the underlie is the complement of the dip.

Undulate, Undulation.—Beds which are rolled into alternate elevation and depression are said to *undulate*, or be like little waves (Lat. *undulae*).

Uniclinal.—When curves exist in beds, there are generally both sides to the curve; but when the beds are only bent in one direction and then proceed again with the same general dip and strike as before, there is said to be a *uniclinal.*

Univalve.—Having only one valve, or lid, or covering: used for shells, such as common snail, and which are all in one piece. *Bivalve,* on the contrary, is having the covering or shell in two pieces, such as a cockle. *Multivalve,* when the covering, as in the chiton, the balanus, &c., is of more pieces than two.

Unstratified.—Not disposed in strata or beds, but in masses: often used as nearly synonymous with *igneous*, but is not strictly so.

Upheave or Upheaval, Uplift.—A lifting or heaving up of rocky beds or masses from beneath. *Upthrow* and *downthrow* are common terms to express the same motions.

Upthrow.—*See* FAULT and THROW.

Valley.—A low-lying tract of country bounded by hills; generally contains a stream or river, which carries off the drainage of the adjoining higher grounds. Valleys are distinguished as *longitudinal* or *cross-valleys*, &c. Large flat areas, which are drained by more streams than one, are called *plains*, not valleys. When the stream course is through a narrow deep channel, without flat ground on either side, it is called a *ravine*, or *gorge*, or *glen.* All valleys are essentially the results of erosion or denudation of the surface of the solid rock, whatever cause may have originated the depression or drainage area.

Vein.—Any fissure or rent in the rocky surface of the earth, filled with mineral or metallic matter, different from the adjoining rock. If such fissures be filled with granite or trap rocks, or generally with merely rocky matter, they are generally called *dykes;* but when they contain metalliferous minerals they are called *veins* or *lodes.* If they are filled only with débris fallen in from above, they are often called *false veins.*

Veined.—Marked or streaked with lines of different colour from the mass; as, *veined marble*, &c.

Veinstone or **Veinstuff.**—The mineral matter which forms a vein as distinct from the metallic ores which occur in it or of which the vein-stone is the matrix or gangue.

Ventral.—Relating to the belly.

Ventricose. — Bellying: swelling or bulging out in the middle.

Vermiform.—Worm-like, or worm-shaped.

Vertebra.—A single bone or joint of the backbone or spinal column. There are those belonging to the neck, or *cervical vertebrae;* to the back, or *dorsal;* to the loins, or *lumbar;* to the tail, or *caudal*, &c.

Vesicular.—Having small bladder-like cavities, full of vesicles. Rocks often have these little cavities, which appear to have been produced by the disengagement of air or of some other gases, when the mass was in a molten state; often called *air-bubbles*, or *air-blobs*.

Vitreous.—Glassy; having the look of glass.

Vitrify.—To convert into glass. *Vitrified*, glazed, or converted into glassy matter. *Vitrification*, conversion into glass or glaze.

Volcanic.—Resulting from or produced by a volcano; as applied to rocks, means, produced by igneous action near the surface, as contrasted with *Plutonic*, produced by igneous action at great depth in the interior.

Volcanic bombs.—Round or pear-shaped irregular masses of lava, thrown out from volcanic vents, of very varied size. They are small masses of viscid scoriaceous lava, projected with great force and acquiring a rotary motion in passing through the air. Cooling and solidifying as they travel, they fall, and are often accumulated in great numbers.

Volcanic cones.—The conical hills which are formed round the orifice or crater of a volcano by the accumulation of ejected matter, in the shape of lava or cinders or ashes.

Volcanic mud.—The heated mud, generally sulphurous, which is thrown out from mud volcanoes, or fumaroles, &c.; volcanic mud is also formed during an eruption by the union of water, which is emitted as aqueous vapour, and subsequently falls as rain, and the dust and ashes ejected at the same time. The mud so formed collects in streams on the sides of the cone, and the streams of *mud lava* so formed often do more damage than the true lava streams.

Volcano.—Generally described as a hill or mountain or cone formed round a volcanic orifice or opening; but the volcano is this orifice or opening into the interior of the earth, the hill, &c., being only the subsequent results of its existence. It is an orifice through which occur explosive discharges of elastic gases and vapour, carrying with them scoria and other fragmentary matters, which are projected to great heights. These fall again, some into the vent or orifice, and are again and again ejected; others fall outside and are accumulated into a circular bank, and so gradually, if the ejections are sufficiently continued, into a high circular hill, or conical ridge, encompassing the crater. One side of this ridge is always lower than the others, owing to the drifting of the ejected masses by the prevailing winds of the locality in given directions.

Warp.—A provincial term for the fine mud or silt held in suspension in rivers, and deposited where the waters become stagnant. *Warping* is allowing these waters to cover low lands at high tides, to remain there till the mud is deposited, and then again turning the water off clear at low water. This mud is very fertilizing.

Waste.—The *waste* in a mine is the old neglected part of the mine, unattended to, or allowed to go to waste.

Water of crystallization.—Many minerals, in becoming solid or crystallized, combine chemically with a certain fixed proportion of water, which forms an essential part of their crystals: this is called the *water of crystallization.*

Watershed.—The line which separates two systems of drainage, and which *shed off* the water on either side.

Water-worn.—Worn away; rounded or smoothed by the action of water. Water-worn blocks may generally be distinguished from weather-worn, by their smoothness; whereas the action of the weather, atmosphere, &c., is generally to roughen the surface.

Weald (from *wold*, Saxon).—A woodland: applied especially to the Weald of Kent and Sussex, the low country between the North and South Downs, or Chalk hills of Kent and Sussex;

it was formerly covered with timber, and the seat of a large iron manufacture.

Weathering.—The wasting away of rock surfaces by the action of the weather.

Weather-worn.—Wasted away or worn by the action of the weather. *See* WATER-WORN.

Wheal.—A very common name for mines in Cornwall; a corruption of *Huel*, the old Cornish word for a mine, as *Wheal Sarah*.

Whetstone.—Common name for a fine sharpening stone or hone.

Whim.—A common miners' term for the ordinary winding-machine, consisting of a large drum or cylinder placed in a vertical axis, and turned by horse- or occasionally water-power, or by women (very frequently in this country); used for raising coal-ores, &c., from a mine. Two buckets or kibbles are generally worked by each whim, one ascending while the other descends.

Whin or **Whinstone.**—In Scotland, used for hard trappean rock, but often applied by quarrymen to any hard substance or bed which interferes with their progress.

Windward.—*See* LEEWARD.

Winning.—A term commonly used in mining to express every operation by which a mineral is procured or *won* from the earth; chiefly applied now to coal-mining.

Wood-coal.—Lignite, or brown coal. Coal in which the woody texture is seen or preserved.

Wych or **Wich.**—Celtic for salt-spring; often found in England as the termination of names of places where salt is or has been found—*Droitwich*, *Nantwich*, &c.

Zechstein (Germ.).—Mine-stone. So called because it had to be cut through or mined before reaching the Kupferschiefer, or copper shale, which lies below it. Equivalent of the Magnesian Limestone of England.

Zenith.—*See* NADIR.

Zero.—The point from which any series commences. In ordinary thermometers (Fahrenheit) zero is 32° below freezing, but this is not the zero of heat.

Zone.—In geography, one of the five belts into which the surface of the earth is imagined to be divided: *torrid* and *temperate*, north and south; the *frigid*, or *Arctic* and *Antarctic*. In geology, applied to belts of depth of water, found to be characterized by peculiar forms, such as *littoral*, *circumlittoral*, and *abysmal:* used to express a bed or group of beds marked by peculiar fossils; as, *zone of Ammonites Bucklandi*, *Avicula contorta Zone*, *&c.*

Zoophagous.—Animal-eating; living on other animals, as distinguished from *phytophagous*, plant-eating.

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